18-19 MEDICAL LIBRARY JAN 27 1938

The Physiotherapy Review

Volume 18 Number 1

Table of Contents

	Page
Colles' Fractures—Robert P. Montgomery, M. D.	3
Mental Hygiene for the Handicapped Child—Bryng Bryngelson, Ph. D.	5
Intermittent Venous Hyperemia: For the Treatment of Peripheral Vascular Disease—Geza de Takats, M. D.	7
Vitamins—Stuart O. Foster, M. D.	9
Peripheral Nerve Lesions: Diagnosis and Treatment—Benjamin Boshes, M. D.	12
Cerebral Palsy: A State Responsibility—Elma R. Harrison, R. N.	19
Is There Hope for the Crippled Adult?—Edward T. Evans, M. D.	23
Residual Neuromuscular Hypertension: Implication for Physiotherapy. Part V. Possible Causes as Well as Consequences of Excess Tension—Josephine L. Rathbone, Ph. D.	25
Massage in Neuropsychiatric Disorders—Gordon R. Kamman, M. D., F. A. C. P.	31
Editorials	34
Index to Current Literature	36
Abstracts—John S. Coulter, M. D.	39
Book Reviews	48

Published Bi-Monthly By
THE AMERICAN PHYSIOTHERAPY ASSOCIATION
JANUARY-FEBRUARY, 1938

The American Physiotherapy Association

Executive Committee

PRESIDENT

CONSTANCE K. GREENE..53 Burpee Rd., Swampscott, Mass.

VICE-PRESIDENTS

DOROTHY FREDERICKSON..11 Chesley Rd., Newton Centre, Mass.
MRS. WINIFRED T. WILLARD..51 Lawrence St., Malden, Mass.

SECRETARY

EDITH MONRO.....483 Beacon St., Boston, Mass.

TREASURER

CECELIA A. LEVERONE..668 Washington St., Brighton, Mass.

BOARD OF DIRECTORS

GERTRUDE BEARD.....303 E. Chicago Ave., Chicago, Ill.
MRS. CAROLINE BROWN..78 Treadwell, New Haven, Conn.
MRS. SARAH U. COLBY..320 N. Gower St., Los Angeles, Calif.
MARGUERITE IRVINE.....1011 Summitt Ave., Seattle, Wash.
FLORENCE PHENIX....522 N. Pinckney St., Madison, Wisc.
MARY E. ROCKHILL....754 Wright Ave., Camden, N. J.

Standing Committees

MEMBERSHIP COMMITTEE

MRS. WINIFRED T. WILLARD.....
.....51 Lawrence St., Malden, Mass.

COMMITTEE ON EDUCATION

FLORENCE PHENIX .....
.....522 N. Pinckney St., Madison, Wisc.

COMMITTEE ON PUBLICITY

HELEN S. FOSS.....
.....Children's Hospital, Iowa City, Iowa

LEGISLATIVE COMMITTEE

HELEN KAISER .....
.....Mt. Sinai Hospital, Cleveland, Ohio

Advisory Committee

ELLIOT G. BRACKETT, M. D.....
.....166 Newbury St., Boston, Mass.

JOHN S. COULTER, M. D.....
.....303 East Chicago Ave., Chicago, Ill.

WILLIAM T. GREEN, M. D.....
.....300 Longwood Ave., Boston, Mass.

SUMNER M. ROBERTS, M. D.....
.....372 Marlboro St., Boston, Mass.

Membership in The American Physiotherapy Association is $8.00 a year, including $3.00 subscription for THE PHYSIOTHERAPY REVIEW. Single copies 85 cents. Subscription for non-members to THE PHYSIOTHERAPY REVIEW $2.50 a year. Single copies 50 cents. Entered as second class matter Mar. 30, 1934, at the post office at Chicago, Ill., under the act of Aug. 24, 1912.

Publication Office: 303 E. Chicago Ave., Chicago, Ill.

Medical
Fopon

The Physiotherapy Review

Published Bi-Monthly by The American Physiotherapy Association

Volume 18 January-February, 1938 Number 1

Colles' Fractures

Robert P. Montgomery, M.D.

The purpose of this article is to emphasize the often disregarded principles in the treatment following reduction of a Colles' fracture.

Because of the frequency of these fractures, and the impairment of function in the hand and wrist that often follows, they are of great importance economically.

Most of these fractures are due to falls upon the palm of the hand. The force is transmitted through the carpal bones to the lower end of the radius. The radius then breaks at the point of least resistance; that is, at the transition zone between the dense cortex of the shaft and the cancellous lower portion.

The fracture described by Colles was a transverse fracture through the lower end of the radius four centimeters proximal to the articular margin with posterior and upward displacement. The majority of the fractures at the lower end of the radius occur from one-half to three-quarters of an inch from the articular margin and the fracture line may be oblique in various directions. The distal fragment is frequently comminuted especially in individuals over forty, and fracture lines may extend through the articular surface into the wrist joint. The typical displacement of the lower fragment is upward and backward, and it is hyperextended so that the articular surface is tilted toward the dorsum; there is a tilting toward the radial side and a rotation outward on the shaft. The hand is displaced with the lower fragment and the "silver fork" deformity is produced.

The ulnar styloid process may be fractured by the pull of the intra-articular fibrocartilage of the wrist joint or by the ulnar collateral ligament. This fracture occurs in about fifty per cent of the Colles' fractures.

There is usually a sudden, large amount of hemorrhage and the extravasated blood often extends into the fingers and entire forearm. The periosteum may be torn. The median and dorsal interosseous nerves may be damaged.

Satisfactory results are obtained in the majority of the treated fractures of the lower end of the radius. Failure at adequate reduction, application of proper splinting to maintain a satisfactory reduction, and allowance of a sufficiently long time of immobilization will produce disabling deformities.

The most common deformity is a dorsal displacement and a backward tilting of the distal fragment. The radius is shortened and there is an incongruity of the joint. This deformity prevents full palmar flexion at the wrist and complete closure of the hand. The patient cannot grasp small objects or make a fist. It usually results in a permanent partial disability and requires an osteotomy for correction as part of the treatment.

Assuming a satisfactory reduction is obtained and an adequate splint has been applied, there remain complications, some of which are avoidable, and some unavoidable.

The type of immobilization is important and varies according to the case. Padded and unpadded circular casts extending to and above the elbow; anterior and posterior plaster molds extending to and around the elbow; posterior plaster molds and padded wooden and metal splints are used. None of these appliances should extend beyond the metacarpophalangeal joints, and opposition of the thumb

324 East Wisconsin Avenue, Milwaukee, Wisconsin.

should not be restricted more than is necessary. Lack of use in these joints will cause limitation in motion.

If an acute flexion, ulnar deviation position of immobilization is used, the thumb, index, and middle fingers should be frequently checked for median nerve, motor, and sensory changes. The position of acute palmar flexion causes direct pressure on the median nerve between the proximal border of the carpal ligament and the distal anterior border of the radius. This pressure can be relieved by lessening the palmar flexion. Pain, a feeling of numbness, or hyperesthesia are warning symptoms. The hand is swollen, the skin may become mottled, reddish in color, and dry. The motions in the fingers are painful and limited. Although the lesion of the median nerve is incomplete and many minor injuries must frequently be overlooked they may play a considerable part in the production of incapacity that frequently follows these fractures. The median nerve carries the major sympathetic nerve supply to the joints as well as to the other structures of the hand.

Because of the large amount of extravasation of blood and the swelling of soft tissues that occurs soon after the fracture, active exercises of the fingers and thumb should be started as soon as the fracture is splinted. These exercises are the most effective way to reduce the hematoma and edema. They should be done several times daily, and active use of the hand should be encouraged from the time the fracture is securely held by some means of fixation.

Massaging the fingers, elevation of the hand in bed, wearing a sling, all aid in reducing the swelling. The return circulation of the hand may be impaired by a too snugly applied circular plaster cast, by binding together too tightly, padded and unpadded splints, and by applying an elastic or other bandage material too snugly to hold a dorsal or palmar splint securely.

Inactivity and continued swelling (edema, exudate, and infiltration of the tissues) will change the physical characteristics of the elastic tissue to a tissue that is less elastic and will cause periarticular and capsular thickening. The stiffness resulting from these changes produce more disability than the Colles' fracture does at the wrist. This is particularly true in aged patients and in those who have a pre-existing arthritis in the affected hand. It is only by use of the tissues that the hand will be restored.

Recurrence of the deformity may occur anytime within three weeks. The wrist should not be left in a palmar flexion position any longer than is absolutely necessary. The change from a palmar flexion position to one that is in a slight dorsal "cock-up" position, or to one that is neutral regarding dorsal and palmar flexion is made within seven to fourteen days. The ulnar deviation is usually maintained.

Some men prefer to keep the forearm and wrist splinted for five weeks and rely entirely upon active motion of the fingers and use of the hand for domestic and professional duties during this period to accomplish the maximum functional result in the hand. During the greater part of this time no sling is used and the elbow and shoulder joints are not restricted.

The more popular method is to remove the splints in part or temporarily for physical therapy in two to four weeks and to continue with a protective dorsal or palmar splint for a total splinting time of five to seven weeks.

The active usefulness of the hand should be encouraged and adjustments to its accomplishments made during the period physical therapy is given.

Heat in the form of lamps, hot water baths and bottles, whirlpool baths, wax baths, and diathermy are all used beneficially. After application of heat, massage followed by increased active use of the hand will be most helpful in reducing the swelling, pain, and increasing the ranges of motion in the joints. Mild passive manipulations allowing only a minimum of pain are necessary in some cases.

Acute bone atrophy (Sudeck's atrophy) is a complication that causes marked disability of the hand for several weeks or months. The bone atrophy appears more quickly and is more extensive than that following disuse. The prognosis is good even though the convalescence is prolonged and pain and stiffness of the hand with trophic changes persist for months. The diagnosis of acute bone atrophy is usually made a few weeks after the original injury to the wrist. Pain dominates the clinical picture. The fingers are fixed in extension and are refractory to any attempt at active or passive flexion. The swelling especially on the dorsum of the hand resembles simple edema. The skin may have a glossy appearance with areas of desquamation and sweating which suggest a vasomotor response to a reflex trophoneurotic action which is the most probable etiology. The marked "moth eaten"

atrophic changes seen in the x-rays of the hand and lower end of the radius strongly suggest a reflex neurotrophic disturbance which produces a local hyperemia and bone absorption.

Prolonged vigorous physical therapy, including heat to a maximum tolerance and active motions, will prevent permanent deformities. Gentle manipulation and active motions should be persisted in, in spite of slight pain. Any form of forced manipulation or fixation is contraindicated.

A second uncommon, but interesting, late complication following Colles' fractures is a spontaneous rupture of the extensor pollicis longus tendon. This may occur weeks, months, or even years after the fracture. The condition is mentioned here because it should be recognized early and treated surgically. The results following surgical repair are good. The etiology is not definitely understood. The tendon may be injured at the time of the fracture or frayed by friction over a ridge of bone on the dorsum of the radius. Those affected cannot extend the interphalangeal joint of the thumb.

Post traumatic arthritis in the wrist joint is a complication following Colles' fractures but it usually occurs in those cases of malunion or comminution where the fracture lines involve the articular surface of the radius. The pain associated with this complication can be relieved in varying degrees by applications of heat, and it may be necessary to avoid strenuous prolonged labors that further traumatize the arthritic joint.

SUMMARY

1. Splints following Colles' fractures should be applied to allow freedom of motion in the thumb and fingers.

2. Active exercises and use of the hand should be started immediately.

3. The usual physical therapy methods are beneficial following the removal of the support.

4. Malunion in the typical position limits full palmar flexion and flexion of the fingers.

5. Transitory median nerve paralysis may be a complication of treatment. Its motor and sensory areas should be frequently observed if an acute palmar flexion position is used.

6. Acute bone atrophy (Sudeck's atrophy) and spontaneous rupture of the extensor pollicis longus tendon are briefly disccussed.

REFERENCES

1. Key, J. A. and Conwell, H. E.: Text—Fractures, Dislocations, and Sprains. C. V. Mosby, 1934.
2. Meyerding, H. W. and Overton, L. M.: Malunited Fracture of the Lower End of the Radius (Colles' Fracture) Treated by Osteotomy. Minn. Med. 18:84, Feb. 1935.
3. Carp, Louis: The Roentgenologic Displacements in Colles' Fracture. Arch. Surg., 24:1, Jan. 1932.
4. Abbott, LeRoy and Saunders, J. B. deC.M.: Surg., Gynec. & Obst., LVII:507, Oct. 1933.
5. Speed, Kellog: Text—Treatment of Fractures, Dislocations, Covering Their Pathology, Diagnosis, and Treatment. Lea, 1935, 3rd Edition.
6. Gill, Bruce A.: Fibrous Ankylosis of the Hand due to Prolonged Swelling. J. A. M. A., 83-1137, Oct. 11, 1924.
7. Platt, Harry: Colles' Fracture. Brit. Med. Jour., 2:288, Aug. 13, 1932.
8. Noble, Thomas P. and Hauser, Emil D. W.: Acute Bone Atrophy. Arch. of Surg., 12:75, 1926.
9. Gurd, Francis B.: Post-traumatic Acute Bone Atrophy (Sudeck's Atrophy). Ann. Surg., 99:449, March 1934.
10. Turner, Henry: Neurotrophic Disturbances of the Hand Associated with Bite of a Cat or Colles' Fracture. Jour. B. & J. Surg., XIII:161, January 1931.
11. McMaster, Paul E.: Late Ruptures of Extensor and Flexor Pollicis Longus Tendons Following Colles' Fracture. Jour. B. & J. Surg., XIV:93, January 1932.
12. Moore, Thomas: Spontaneous Rupture of Extensor Pollicis Longus Tendon Associated with Colles' Fracture. The Brit. Jour. Surg., XXIII-721, April 1936.

Mental Hygiene for the Handicapped Child

Bryng Bryngelson, Ph.D.

The child who is different in physical appearance, speech, or personality, and harbors a deep sensitivity toward the social involvements of that difference is likely to develop a feeling of inadequacy. This child can be spoken of as handicapped inasmuch as the difference is usually defined by the child as a mark of inferiority. A habit pattern of insufficiency forms, and ultimately as the sensitivity increases the child matures physically and mentally but remains emotionally an infant. Being an infant on the level of feeling in an adult environment is not any too comfortable for the person, and in the wake of dreams and reality—social morbidity, asocial conduct, and misbehavior is the end attained. No one but the so afflicted can truly appreciate the hopelessness and utter dispair of this kind

Director of Speech Clinic, University of Minnesota, Minneapolis, Minnesota.

of predicament. Yet, many thousands of children in each generation are victims of this type of frustration, and what are parents, clinicians and educators doing to avoid the occurrence in the future of such maladjustments and in the rehabilitation of those already on the scene?

In the first place, all too frequently the person managing a sensitive child is also sensitive. This only leads to methods which attempt to build for the child compensations to offset the condition of a difference. The end of such growth is often a too wide disparity between the person's scale of value and his potentialities. Secondly, so often is a parent or teacher reticent in bringing the difference into the foreground. This attitude tends to hide the facts of the condition, under the guise of disinterest, superficial calmness, or a complete withdrawal from the problem. Feeling overly sorry for the child is, too, an old technique in mental hygiene, which has done little to eradicate the roots of inferiority. Inadequate emotional poise on the part of the clinician or an attempt to soothe the injured child tends to increase the personal insecurity, and at the adult level we have not one problem but two—namely, the disorder and the disordered personality.

Through more modern mental hygiene methods, an entirely different approach is made to the child marked by a difference. Realizing that frankness, honesty, and objectivity, when communicated with wholesome understanding, have never done anyone any harm, a modern mental hygienist faces with the child the fact of his difference. When the parent, teacher, or clinician accepts the difference as a way of being, talking, thinking, walking, or feeling, the child has no need to build up defenses, ruses, or guises to cover the all too true fact; namely, "I am crippled, I stutter, I have bow legs, a big nose, a paralyzed limb, et cetera." It is only at the point of disapproval, shame, or anxiety on the part of the clinician that a child defines his difference as a handicap. When his difference is accepted, talked with, humored and placed properly in the entire Gestalt of the child as a person, one creates in him a wholesome attitude, one which will never need any apology or any defense when he first meets the playground jeers, rebukes and teasings. There are no such speech patterns on the playground when the one jeered at accepts it with even a louder jeer than that heard the first time, or accepts the indictment by a frank confession of the existence of the thing attacked. Teasing is only the confirmation of a response wanted by the teaser. When one teases oneself first or responds to a tease with a smile, the proposed antagonism ceases. There is a tremendous difference between being laughed *at* and laughing *with* someone. A gracious parent or teacher will assist the child in such a wholehearted acceptance of his difference that he will even see all the possibilities of nicknames which might well be directed toward him because of his gait, speech, or physical appearance. There is nothing more charitable than an adult who knows himself so well that he verbalizes his weaknesses before others have a chance to do so. This knowledge and insight can be given a child when very young so that social inadequacy will not stand in his wake, and morbidity need not stamp him as asocial and intolerable. Instead, he will, like any other person free from differences, grow to maturity with a rational philosophy of living, conscious of his potentialities, competing only with himself and using his powers of thought for constructive enterprises.

I say, then, to all you folk who have concern over the care of the so-called handicapped child, that if you believe that humility, confidence, and honesty are preferred to arrogance, fear, and deceit, you should get insight into your own maladjustments, verbalize them, and sense them with a wholesome humor. Then, and only then, are you mature enough emotionally to manage a child with a difference.

This message has some social implications. What a different social order we would have if citizens began to seriously examine their real motives in promoting programs for social readjustments; if people at large would understand their inferiorities and their defenses for them. In other words, if honesty with self prevailed, I wager that strikes, wars, and destructive social programs would be difficult to promulgate. We as a people would at last see the futility of our rationalizations, projections, and over-compensations and rise to a manhood and womanhood which alone can be said to be civilized. This program of social rehabilitation is a life long process, which needs must commence with children—the citizens of tomorrow.

In dealing, then, with handicapped children from this objective mental hygiene point of view you may be instrumental as a pioneer in constructing a changed social order, and all those "different" children your heroic disciples.

Intermittent Venous Hyperemia

For the Treatment of Peripheral Vascular Disease

Geza de Takats, M.D.

Introduction

In the beginning of this century, surgical thought was greatly agitated by the writings of Bier on venous hyperemia[1]. Acute and chronic infections were widely treated by passive hyperemia. Little attention was paid at that time to the circulatory effects of venous construction and to the advantages of alternating venous constriction with periods of release. While such treatments by intermittent venous constriction were advocated as early as 1913 by Thies,[2] credit should be given to Collens and Wilensky[3] for devising an automatic apparatus with which intermittent venous compression of various intensity and duration can be readily produced. An analysis of the results obtained from a later publication[4] reveals that the method is not entirely harmless, as the simple venous stasis, when produced repeatedly without adequate drainage of the stagnating venous blood, might readily precipitate gangrene and amputation in limbs suffering from diminished blood flow. In addition, the price of the apparatus was prohibitive for the home-use of great masses of people. For this reason de Takats, Hick and Coulter[5] inquired into the feasibility of supplying the patient with a simple inexpensive device intended for use in the home.

Method of Application

Any blood pressure apparatus can be used to produce intermittent venous hyperemia, but a wide eight-inch cuff conically shaped to fit the thigh is preferable. The amount of pressure should not exceed the diastolic pressure of the extremity at that level. It varies between 90 and 60 millimeters of mercury. The optimal pressure must be determined individually for each case. After inflation of the cuff, the dorsal veins of the foot become distended and the toes show definite rubor. This reaction must take place within one or two minutes. If absent, the cuff-pressure must be raised or there is such a strong vascular spasm present that it must be first released by physical pharmicologic or surgical means before the treatment is effective.

This vascular spasm is slight or absent in arteriosclerosis or diabetic endarteritis but may be marked in Buerger's disease and in the spastic vascular conditions manifesting Raynaud's phenomena.

During the period of compression, arterial flow continues but venous outflow is obstructed, thus resulting in a filling and stretching of the venocapillary bed. When the compression is released, there develops an increased arterial inflow, a reactive hyperemia, which often gives the sensation of a warm wave passing toward the periphery. In limbs whose circulation is normal, this reactive hyperemia completely compensates for the venous stasis and flushes out the peripheral blood from the terminal vascular bed. In limbs with arterial occlusions, the period following release is not capable of freeing the extremity from the accumulated venous blood. For this reason a third phase was suggested, which consists of elevating the leg either actively, by having the patient raise his foot 30° to 40° above the horizontal, or passively with the help of a pulley.

This vascular exercise then consists of three phases: (1) a period of compression, by inflating the cuff to 60 or 80 millimeters of mercury and obtaining a good rubor of the toes; (2) a period of release, still in the horizontal position, which should last as long as the compression did and allows for the development of a reactive hyperemia; and (3) a period of elevation, which helps to evacuate the venocapillary bed. This latter phase lasts one minute. The duration of a cycle is either $1 + 1 + 1$ minutes or $2 + 2 + 1$ minutes, and ten cycles constitute one treatment.

It is advisable to have the patient take one treatment in the morning and one treatment in the evening. Most patients are capable and willing to do this exercise at home, but frequent supervision is advisable as changes in

Associate Professor of Surgery, University of Illinois, College of Medicine; Attending Surgeon St. Luke's and Research and Educational Hospitals, Chicago, Illinois.

pressures or duration of cycles may become necessary. Some patients will not carry on these treatments for any length of time or are too debilitated to do it themselves. In such a case some member of the family may help or an automatic type of apparatus may have to be used. At least one hundred treatments are necessary to accomplish any results.

INDICATIONS FOR TREATMENT

The obliterative type of vascular disease seen in arteriosclerotic diabetics and late healed stages of Buerger's disease are selected for treatment. Pure vasospastic circulatory disturbances seen in Raynaud's disease or Buerger's disease with vascular spasm are not influenced by such treatments. When patients present themselves with mild pain or cramping after walking four or five blocks but still have a slight pulse in one of the arteries at the ankle, this treatment will be far more beneficial than if they have continuous pain at night, chronic ulcerations or gangrenous digits. The stage of the disease in which treatment is begun is of the greatest importance.

If venous stasis, edema or ulceration is present, the pressure in the cuff should not exceed 40 millimeters of mercury. In the presence of a phlebitis, lymphangiitis or acute spreading infection, the intermittent venous hyperemia is not permissible. Chronic edema, lymphstasis or a chronic ulceration do not contraindicate treatment, although the method should be used with caution and continuous supervision.

In the presence of marked vascular spasm, the method is ineffective. If not otherwise indicated, sympathectomy should free the extremity from control or reflectoric vasomotor impulses. For milder forms of vasospasm, heat or vasodilators such as nitrites, papaverine or theobromine can be given concomitantly with the venous compression. In all form of vasospastic disease, tobacco is strictly forbidden.

RESULTS OF TREATMENT

To date over 50 patients who have had more than fifty treatments have been followed. Coldness and numbness are the first symptoms which are relieved, intermittent claudication improves slowly, in some cases from a few blocks to three miles, in others hardly perceptibly. The degree of improvement depends on the ability of the patient to form collaterals, his cardiac reserve, extent of damage to the vascular tree, and his mental attitude, which in all these cases is very important. Rest pain, if present, is a sign of serious circulatory disturbance and at this stage little can be expected from such teatments.

COMMENT

In conjunction with other forms of therapy, known to be beneficial for patients suffering from peripheral vascular disease, intermittent venous hyperemia offers a simple inexpensive type of vascular exercise, intended for use in the home, and it is available to a larger mass of people who cannot or will not come to larger hospitals for treatment with a suction apparatus. In addition, based on some clinical research described in the body of their paper, de Takats, Coulter and Hick have felt that most of the benefit derived from the suction and pressure treatment is simply produced by alternate constriction and release and that better adaptation of such cycles to the patient's individual circulatory embarrassment will be productive of superior results.

There are obvious disadvantages of this method. It requires an active participation of the patient and cannot be used in acute arterial occlusions where treatments should be almost continuous. In bilateral involvement, the use of double cuffs becomes necessary with simultaneous elevation of the two lower extremities; this may be cumbersome to some patients. Finally it may lead to unsupervised self-treatment in the home, but this objection is valid for any type of heat, lamp or exercise that may be prescribed for the home.

SUMMARY

The simple method described here produces intermittent venous hyperemia combined with postural emptying of the venocapillary bed. The compression fills and stretches the vascular tree, the release allows for a chemical vasodilatation to take place in the form of a reactive hyperemia and the elevation empties the terminal vascular bed and makes room for a fresh supply. The method should be used in conjunction with other recognized forms of conservative and surgical therapy. The general cardiovascular status and its progressive or stationary trend will determine the ultimate result of any local therapy.

BIBLIOGRAPHY

1. Vogel, F. C. W.: Hyperamie als Heilmittel, Leipzig, 1903.
2. Thies, A.: Verhandl. d. deutsch. Gesellsch. Chir., 42:96, 1913.
3. Collens and Wilensky: Am. Heart J., 11:705, June 1936.
4. Collens and Wilensky: The Treatment of Peripheral Obliterative Arterial Diseases. Jour. A. M. A., 107:24:1960, Dec. 12, 1936.
5. de Takats, Geza; Hick, Ford K., and Coulter, John S.: Intermittent Venous Hyperemia in the Treatment of Peripheral Vascular Disease. Jour. A. M. A., 108:1951, June 1937.

Vitamins

Stuart O. Foster, M.D.

As we look at healthy American-born children we often compare them to their foreign-born parents. Today the science of nutrition, which has made such tremendous progress in this country in the past few decades, is recognized as playing the leading part in producing this growth. For the proper nutrition of these youngsters, one of the first things to be considered is the necessary vitamins in their diet. Our living standards in this country are high compared to those of other countries, but even here there are many defects which may be detected easily by the medical eye, such as defective teeth, poor skin, lack of resistance to infection, stringy hair, and chronic fatigue. These are only signs of borderline cases, but it is the borderline stage rather than the definite deficiencies, such as scurvy, rickets and pellagra, which keep great numbers of the population all their lives below the level of well-being and achievement they might have attained.

It is in the poorer classes that vitamin deficiency is more often found. This is usually true because their only means of keeping their diet cheap and filling is by loading them with macaroni, potatoes, and other starchy foods. However, it is not only in the poorer classes that vitamin deficiency is found as in many cases it is due to ignorance. Some housewives do not know how to plan a well-balanced diet. Sometimes dietary fads cause one to become lacking in certain vitamins. Then too the process employed in storing, refining, and cooking is an important factor.

We should not think of vitamins as giving supplies of energy, because they serve only as regulators to help growth and well-being. As long as vitamins are present in our diet we need never worry; it is when they are absent that due consideration must be given them.

Taking them alphabetically, let us go into further detail concerning these important vitamins that are so necessary for our everyday life. Vitamin A stimulates growth and is necessary for well-being at all ages. It is also thought to be anti-infective, particularly with reference to the mucous membranes of the eyes, intestinal tract and upper respiratory tracts, including the sinuses. Vitamin A is soluble in fats but only slightly soluble in water. It has been found to be associated with fats and fat-like substances and is removed from its sources by extraction with fat solvents. Vitamin A is largely distributed in products of both animal and plant origin, the main sources being fish-liver oils, liver, butter, cream and eggs. Foods having yellow or green color are generally rich sources of this vitamin. Green leaves, yellow corn and sweet potatoes are better sources than bleached leaves and white potatoes.

As the main sources of vitamin A represent the more expensive foods it is very often noted that the poor do not consume enough food that contains quantities of vitamin A in order to build up their resistance sufficiently to throw off infection. Very often vitamin A deficiency is found in countries like China and India, especially during times of war, famine, flood and drought. This is sometimes true in other countries as well. Deficiency in vitamin A is more often noted in children than in adults because there is no demand on storage deposits for the purpose of growth. Since the average food supply of this country furnishes adequate amounts of vitamin A there is very little evidence of lack of it.

And now for the history of vitamin A. The most readily appreciated clinical symptoms of vitamin A deficiency have to do with changes occurring in the eyes.

It has been known for centuries that some relationship between ocular conditions and states of malnutrition exist. Hippocrates is quoted as advocating an abundance of liver, or liver and honey, in cases of night blindness, and such treatment is recognized as scientifically correct today in cases of hemeralopia (night blindness) on a nutritive basis. In 1887 endemic night blindness among orthodox Russians during lenten fasts was noted, and during such periods starvation among adults was common. It was observed that babies whose mothers practiced long religious fasts

1726 Eye Street N. W., Washington, D. C.
Read before the District of Columbia Chapter of the American Physiotherapy Association, May 1937.

often had spontaneous sloughing of the cornea. In 1919 Bloch unwittingly performed a human experiment by dividing into two groups thirty-two healthy children from one to four years of age in an institution in Copenhagen—one group receiving whole milk and the other fat or vegetable fat in margarine. In eight cases among those on the vegetable-fat diets xerosis developed and was subsequently relieved by cod liver oil, whereas in the group given whole milk no disturbance developed. Many observers have agreed that vitamin A is a physiologic prophylactic against infection, but its ability to cure or prevent infection when the barrier of the mucous membrance has been passed is still not established.

Vitamin B—the anti-neuritic, growth-promoting vitamin, is necessary for a good appetite and normal muscle tone in the digestive tract. It is also helpful to the normal mother and her baby. An absolute loss of this vitamin may cause muscular paralysis or the disease known as beriberi. As a large number of foods contain a little vitamin B, the sources are numerous. Among the most oustanding are whole grain cereals, wheat germ, leafy vegetables, yeast, chicken, and lean pork. This vitamin is destroyed by long continued heating and by cooking in too much water. Therefore, it is best to use as little water as possible in cooking, and the fruit and vegetable juices drawn out in cooking should be served in some way, probably in soups or gravies in order to obtain all of the nourishment. Vitamin B, being more easily destroyed in an alkaline solution than in an acid, is often destroyed when cooked with soda to preserve the color. This is, therefore, a very bad practice.

Vitamin C, the antiscorbutic vitamin, is essential to the daily diet for adults and children. It is necessary for the prevention of poor teeth and gums. Lack of vitamin C will produce loose teeth and sore bleeding gums. In extreme cases where the diet is lacking in vitamin C, scurvy has been known to develop. Although scurvy is rare in this country, there are some borderline cases with such symptoms as sore gums, loose and decayed teeth, and rheumatism. Tomatoes are our most excellent source of vitamin C even after they have been cooked. The high value of vitamin C in tomatoes is preserved in cooking by the high acidity which they possess. However, it is very readily destroyed in alkaline, especially soda and water. The principal sources are liver, brain, strawberries, oranges, lemons, grapefruit and horseradish. With the exception of tomatoes, cooked foods cannot be depended upon entirely for vitamin C, nor does the body store a supply of this vitamin. Therefore we need some raw fruits and raw vegetables every day.

Vitamin D is also necessary in the building of teeth and bones as well as to prevent and cure stunted growth and rickets. There are only a few sources that contain enough vitamin D. They are egg yolk, fish liver oils, salmon, sardines, butter, liver, cream, milk, oysters, and ergosterol. Ergosterol is a chemical substance changed to vitamin D by ultraviolet light. As our skin contains ergosterol, exposure to ultraviolet light gives us the benefit of vitamin D. This explains how rickets may be prevented and cured by exposure to the sunlight containing ultraviolet light.

The discovery of vitamin D has been of great importance to the medical profession as well as to mankind, because it has brought about the solution of the problem of the cause and the prevention of rickets. At least in civilized countries a severe case of rickets is coming to be a rare disease. It is hoped that in the near future this disease will become as rare as infantile scurvy has become since the introduction of orange juice to the young infant.

The stability of vitamin D is of importance because it takes considerable time for the cod liver oil to be manufactured in Norway and then shipped to other parts of the world. Another thing to be considered is the fact that the number of fish that come to the shores of Norway each year varies considerably. Therefore, sometimes the oil has to be held over from one season to the next. However, the stability of vitamin D in cod liver oil is outstanding as it has been found that two samples which had been kept in a cool place and protected from light for twenty-six years had a vitamin content apparently identical with that of fresh Norwegian oil.

While it is of real significance that our bodies get the proper amount of vitamin D, we must also consider the possibility of a vitamin toxicity. One of the earliest investigations designed to demonstrate the effects of large doses of vitamin D proved that exceedingly large doses, from 10,000 to 100,000 times the minimum protective dose, caused rapid loss of weight followed by death within a short time.

After death, enormous deposits of calcium were found in the walls of the blood vessels and of the vital organs.

Vitamin E, known as the anti-sterility vitamin, is essential for reproduction. It has proved effective in treating habitual and threatened abortion. Proof of storage of vitamin E is given by the feeding of fat and musculature of healthy animals to females of proved sterility and curing them. The feeding of similar tissues from animals reared without vitamin E can never invoke such cures. The animals that have been held on an identical regime, except for the exclusion of small amounts of vitamin E to their diet, present a poorer appearance than do their littermates. The condition of the hair of these animals indicate lack of normal health. They frequently show muscular atrophy, and above all their weight is below that of the vitamin E fed controls. It has become evident that lack of vitamin E affects the body in a more general way than merely injury to the reproductive system. Wheat germ and lettuce are the highest source of vitamin E, although most vegetable oils contain it but not to any concentrated extent.

Vitamin F is believed to be necessary for normal gestation and also seems to have some influence on the skin. It is found in butter, fat, lard, cocoanut oil, corn oil and olive oil.

Vitamin G, also called vitamin B_2, has recently been broken down. It is essential for well-being at all ages. A diet lacking in vitamin G will cause slowing up of growth, loss of weight, and premature appearance of old age. In more acute cases sore mouth, digestive disturbances, and pellagra develop. Vitamin G is found in liver, kidney, milk, eggs, and green leaves. The germ portion of cereal and yeast are also excellent sources. Like vitamin B, it is not easily destroyed by heat unless soda or other alkaline substance is used.

Vitamin K is believed to be an antihemorrhagic vitamin, but having only recently been broken down, very little definite information is known about it.

In closing I repeat that as long as the vitamins are present in our diet in sufficient quantities all is well, but as soon as they are lacking, the disease or abnormal condition which they prevent will develop. However, if a person eats a well rounded diet including vegetables, fruits, salads, and milk, it is probable he will obtain sufficient vitamins for all ordinary requirements.

Gonzan Gotō, 1659-1733, founder of the Ikki-Ryutai-Ron, teaching that the pathogenesis of disease lay in disturbances of the circulation of the life force. According to him the life force is identical with the pneuma, which circulates in the world and which creates and is all things. The circulation of this life force is disturbed by cold, wind, heat and moisture causing disturbances of nutrition and disease. From this it is clear that in the treatment of disease one should seek to do away with these circulatory disturbances. To this end Gotō recommended the use of bear's liver, red pepper, the burning of moxas and lastly mineral baths.

Sbuwan Kagawa, 1683-1755, was the author of a voluminous work on internal pathology entitled "Ippondō Kōyoigen"; and also one on pharmacology, "Yaku-Sen"; in which he describes the successful use of massage and mineral baths.—*From "JAPANESE MEDICINE" by Y. Fujikawa, M. D.*

Peripheral Nerve Lesions:

Diagnosis and Treatment

Benjamin Boshes, M.D.

Injuries to the peripheral nerves are commonly encountered in every walk of life but are seen most frequently in warfare where wounds and injuries to the extremities occur in such large numbers. My own experience with these lesions, and therefore my ideas, are influenced to a great extent by my having learned about them while taking the course of neurological training under Dr. Lewis J. Pollock. The latter has had a most extensive experience with peripheral nerve lesions, particularly during the World War, and his observations are recorded in the monograph "Peripheral Nerve Lesions" which was written in collaboration with Dr. Loyal Davis. This book with its rich bibliography makes a good basis for any study of peripheral nerve injuries.

To make a diagnosis of a peripheral nerve lesion, several points must be taken into consideration.

History

This must include the date and nature of the injury and an accurate localization of the wounds of entrance and exit. The subjective and objective symptoms at the time of occurrence are recorded as is also a careful progress history to the time of the examination. The progress of the paralysis and of the sensory phenomena is noted. Finally a detailed story of the treatment should be obtained, especially operative reports.

Examination

Before examining the local injury it is well to go over the entire patient. In civil practice especially this is important. Syringomyelia may be diagnosed ulnar nerve lesion because the examiner failed to have the patient undress. There may be more than one lesion. Other tissues may be involved.

Motion is examined first because it is lost or impaired when a peripheral nerve is injured. Voluntary motion is observed. It is generally impossible to study motion of a single muscle except in isolated instances. What one really studies is movement about joints. There are other conditions that may affect the latter such as swelling, fractures, dislocations, adhesions, ankylosis of the joint, contracture of the opposing muscles, spasms, sclerosed fibrous tissues as in ischemic paralysis, section or loss of tendon or muscle, and hysteria.

Posture of the limb is important and may present itself as a wrist-drop, foot-drop, claw or simian hand.

Active Motion is studied in detail, eliminating modifying factors like fibrosis, swelling, pain, et cetera. The effect of gravity must be considered. The degree of weakness or motor deficiency is to be determined. Accurate measurements of muscle function are obtained by a dynamometer.

Supplementary Muscle Movements or trick movements are often sources of error in examination. For example, in lesions of the radial nerve, causing a wrist drop of not over 120°, complete flexion of the fingers produces extension at the wrist. Here there is a mechanical factor. Sometimes anastomotic and atypical nerves help make up the defect. Elastic recoil may simulate active motion. This is particularly important to the physical therapist who, watching the progress of the patient day by day, must not be fooled by the patient's being able to do something new. The movement may be evidence of recovery but may also be a recently discovered trick movement.

Joint Changes following nerve injury may cause considerable disability, especially when the limb is improperly immobilized. Shortening of opposing muscles, loss of tone and atrophy of the affected muscle occur after the nerve is interrupted.

Subjective Sensory Disturbances. Pain is infrequent after nerve injury except causalgia.

Department of Nervous and Mental Diseases, Northwestern University Medical School, Chicago, Illinois.

Read before the Chicago Chapter of the American Physiotherapy Association, December 1, 1937.

Hyperesthesias and paresthesias are also uncommon.

Causalgia usually accompanies median and tibial nerve injuries. Frequently it is associated with glossy skin, blisters, papules and nail changes. The finger tips are swollen. Motor paralyses are slight here, but interphalangeal fibrosis is common. The disturbance generally begins several weeks after injury. The pain is described as piercing, throbbing, grinding, stabbing, and burning. The slightest exposure or jarring starts a paroxysm. Relief from the burning is sought by application of wet compresses.

Objective Sensory Disturbances. As a result of partial or complete interruption of the sensory portion of the peripheral nerve, various degrees of anesthesia and analgesia result. Sensory examinations are difficult. They require the complete cooperation of a patient who understands the function of the examination. Some sort of esthesiometer and algesiometer should be used. Temperature sense, deep touch and pressure, vibration, and joint sense all must be checked.

Nerve Overlap. It is well to keep in mind that the sensory loss seen immediately after injury will be markedly diminished when after about 43 days the overlap from adjoining nerves becomes manifest. Here again is a warning for the physical therapist. In a complete section of the nerve the immediate loss of sensation after the injury may be the total anatomical distribution. The loss is for all modalities of sensation, deep sensibility, (pressure, joint and position sense, deep pain—generally distributed with motor nerves), protopathic sensibility (pain and extremes of heat and cold not sharply localized), and epicritic (cutaneous localization, fine degrees of pain and temperature, and two point discrimination). In anywhere from 30 to 100 days after a complete lesion, even unsutured, provided the adjoining nerves are intact, and averaging about 43 days (Head, Rivers, and Sherren) there is a return of sensation in the areas next to the healthy nerves, leaving a rather small zone of sensory loss. Examination, however, reveals that the return of sensation has been only for gross pain and temperature. Cotton-wool touch, fine discrimination of degrees of pain and temperature are still absent. There has been no recovery of function of the affected nerve. Only the assumption of function by adjoining nerves in the "zone of overlap" has occurred. This is particularly to be watched where sensation is being observed carefully after a nerve suture. A "miraculous" recovery of sensibilities occurs after six or more weeks when, according to the rate of nerve repair, such should not have occurred for six months. Investigation of the modality returned may reveal only protopathic sensation in that zone. The residual zone of analgesia and anesthesia remains unchanged,—the area of isolated nerve supply (See below for evidence of sensory recovery). The specific distributions will be considered under the single nerve.

Vasomotor, Trophic, and Secretory Disturbances may occur after peripheral nerve injury. There may by cyanosis, swelling, edema, local asphyzia, and gangrene. Often the limb is succulent and blood rushes out after a pin prick. Certain nerves like the median are more often affected. Skin, hair and nail changes may occur. Trophic ulcers may appear.

Electrical Examination. A muscle is stimulated chiefly through its nerve supply, especially if the electrode is applied over the motor point, the point of entry of the nerve into the muscle. When the nerve is severed the altered response to the electrical stimulation results in the "reaction of degeneration (R.D.)." The excitability of the nerve for the faradic and galvanic current is abolished. The muscle loses its excitability for the faradic current. In the first two weeks it is hyperexcitable to the galvanic current. Then this excitability is diminished so that more current is necessary. The character of the response is altered. The fibrillary elements respond with a brisk twitch, even to faradism. When these are gone, only the sarcoplasm remains. This responds solely to the galvanic current, and then with a slow contraction and relaxation. The loss to faradism appears in two weeks. The best indication of the reaction of degeneration is the slow contraction of the muscles. Partial lesions result in diminution to these currents. At the end of twelve to twenty-four months, in a complete lesion, all responses disappear. A normal muscle responds best at its motor point; a degenerated muscle best by direct stimulation of all its fibers; therefore a current passing longitudinally through a muscle evokes the best response. This gives the so called "reaction at a distance" and may be used the first six months after injury. It generally requires less current than direct stimulation.

Reflex Changes are specifically related to the

nerve injured; that is, absent Achilles jerk in sciatic nerve lesions, absent wrist jerk in radial nerve lesions, et cetera.

Differential Diagnosis. Here one must rule out several tendons, fractures, dislocations, inflammatory reactions, fibrosis, myositis ossificans, ischemic paralysis (Volkmann's), central nervous system lesions, and functional paralyses. Without going into detail about each of these difficulties, it should be emphasized that a complete, detailed examination of the *entire* patient is important although the defect appears local. Thus what may present itself as a paralysis of hand muscles only may be a brachial plexus lesion with spinal cord involvement. Functional paralyses may present lesions that could not be the effect of the purported injury, while the findings that should result are usually absent. Electrical reactions as well as sensory studies should be included in every investigation. X-rays, serology, in fact, all the accessories used in a detailed medical workup may be necessary to establish a diagnosis.

Recovery of Function. Evidences of regeneration of the nerve are manifested by recovery of function.

Recovery of Sensation. Rapidly recovering lesions do not show a dissociation in sensation. Pin prick and touch return together. The return of function follows no definite order. Painful sensations on pinching are an early manifestation of recovery. Tinel's sign of distal formication on pressure or percussion over the site of nerve injury was found not to be so reliable as some report. The pattern of sensory recovery to pain as a result of overlap is characteristic. It never returns in the area of isolated sensory supply of a given nerve but occurs along the borders of an uninjured nerve and may be described as a shrinkage process. The characteristic features of the sensory change of regenerating nerves are: return of sensibility to pain, touch, or temperature sense in the isolated sensory supply of the affected nerve, return of sensibility to pain, touch, or temperature sense in patches some distance from the area supplied by an adjacent uninjured nerve, return of sensibility to pain, touch, or temperature sense in deep indentations, diminution of the loss of these modalities in the isolated supply of the nerve, return of these sensibilities in the border between the sensory supply of simultaneously injured nerves, and interlacing of the border of sensory loss of one type of sensation with that of another.

Atrophy. Since the amount of atrophy observed some months after injury is not commensurate with the severity of the lesion, and since absence of atrophy is not an indication of a spontaneously reparable lesion, arrest of atrophy and return of tone cannot be used as an index of recovery some months after injury.

Electrical Reactions. Partial lesions showing recovery before eight months may respond to the faradic current before motion returns. At times motion was present and faradic response absent. The best electrical indication of recovery was an increase of rapidity in response to the galvanic current.

Recovery of Voluntary Motion. One must rule out apparent recovery that is due to supplementary motility. Generally, in severe lesions, some tone returns before there is any voluntary motion. Early movements are quite clumsy.

In the experiences of Doctors Pollock and Davis, the order of return of function in an injured nerve in severe lesions is: sensation to pinching over the isolated supply of the nerve, spontaneous aching in the muscles, return of motion, return of other objective sensibility, and finally a return of electrical excitability.

The earliest critical sign of recovery in a complete physiologic interruption is five months, but it is frequently eighteen to twenty-four months after injury. Following primary suture, recovery is demonstrable in eight to nine months, while after late sutures and in severe spontaneously recovering lesions, evidences of recovery may not be seen until the eighteenth month.

Knowledge of peripheral nerve injuries consists in correlating the foregoing material with the anatomy and physiology of the specific nerve. Only high spots will be discussed here.

RADIAL NERVE

This is the most common nerve injured in civil life, especially in fractures about the humerus. It is affected by dislocations of the shoulder, pressure on the arm as in "Saturday night paralysis" or in malposition during anesthesia.

Radial nerve paralysis results in an inability to extend the thumb, proximal phalanges of the fingers, wrist, elbow, and to abduct the

thumb in the plane of the hand. The thumb is adducted and there is wrist-drop. The patient cannot make a fist adequately because flexion of the fingers is impossible due to impossibility of shortening the distance between the origin and insertion of the extensors of the wrist and fingers by extension at the wrist. The thumb may interfere with flexion of the index finger. In lesions of the radial nerve below the elbow, paralysis of the extensors of the fingers may occur without involving those of the wrist.

Supplementary Movements. Extension of the wrist may be obtained by energetic contraction of the flexors, especially if the wrist-drop is not over 120°. It is possible to tense the proximal phalanges by extending the terminal ones through the interossei. However, the proximal phalanges flex with this movement because of the unopposed action of the lumbricales.

Sensory Symptoms. The radial nerve has an extension overlap from adjoining nerves. The area of isolated supply is only a small patch on the dorsum of the hand between the thumb and index finger. Sensation is lost most frequently over the superficial radial nerve distribution. This minimal sensory loss is due to the fact that six nerves supply the dorsum of the hand: the median, superficial radial, external cutaneous branch of the radial, musculo-cutaneous, median cutaneous of the forearm, and ulnar nerves.

Partial lesions depend upon the level of the section and upon the extent of involvement.

MEDIAN NERVE

In civil life this nerve is injured by stab wounds, glass splinters, tourniquet compression, splints, casts, compression in anesthesia and in sleep, fractures and dislocations about the elbow, fractures of the shafts of the bone of the upper limb, cut wrists, occupational atrophies, cervical rib, et cetera.

As a result of a complete interruption of the median nerve, the hand deviates to the ulnar side of the forearm. Atrophy of the muscles of the thenar eminence with loss of opposition of the thumb produces the "ape-hand." Pronation is incomplete and defective; paralysis of the flexor sublimis and the outer part of the flexor profundus results in absence of flexion of the index finger and feeble flexion in the middle finger. This is readily brought out on attempting to make a fist, the "fist-sign," or on trying to clasp the hands as in prayer, the "clasp-sign." Paralysis of the flexor sublimis pollicis makes it impossible to flex the distal phalanx of the thumb, and thenar muscle involvement results in an inability to oppose the thumb to the other fingers and to abduct it at right angles to the palm.

Supplementary Movement. Pronation is aided by rotating the arm with the forearm flexed and the elbow held out. The deep flexor of the middle finger sometimes receives a branch from the ulnar nerve. Opposition of the thumb to the other fingers may be simulated by the action of the adductor pollicis and flexion of the terminal phalanges of the "opposed" finger.

Sensory Symptoms. The large overlap of the radial nerve to the palm explains the dissociation of loss to epicritic and protopathic sensibilities in a median nerve lesion. The loss to touch and slight temperature changes follows the anatomic distribution; namely, the radial side of the palm, palmar surface of the thumb, the index, middle, and sometimes the outer half of the palmar surface of the ring finger, and the dorsal surface of the distal two phalanges of the index and middle fingers. After about forty days, the loss to pain and higher degrees of heat and cold shrinks so that the former may occupy only part of the second phalanges of the index and middle fingers. The isolated sensory supply of the median nerve to pain occupies the dorsal and palmar surfaces of the distal phalanges of the index and middle fingers, the ulnar half of the palmar surface of the second phalanx of the middle finger, and the dorsal surface of less than half of the second phalanges of the index and middle finger. Position sense is often lost in the index finger, and vibration sense in the distal portion of the index and ring finger.

Vasomotor Symptoms. Median nerve lesions frequently cause a purplish, cyanotic, cold hand. The skin is often dry and keratotic. Nail changes with ridging and hypertrophy are common. Trophic ulcers are also seen in this lesion.

Causalgia is a not infrequent association of injuries to the median nerve.

Fragmentary Lesions of the median nerve vary with the level and the extent of the injury.

ULNAR NERVE

In civil life the ulnar nerve is injured by compression during sleep or anesthesia, injuries about the elbow-joint, callus formation, dislocation of the humerus, cervical rib, tumors, and occupational paralyses, especially in

watch workers, metal workers, cigar-makers, telephone operators, and others.

The paralysis after injury may come many years later, the so-called "late-paralysis." The ulnar nerve may be singled out in lead poisoning, or it may be involved as a mononeuritis.

Motor Symptoms. Paralysis of the ulnar nerve produces inability to flex the proximal or distal phalanges of the ring and little finger, adduct and abduct the fingers, extend the second and distal phalanges of the fingers, to contract the flexor carpi ulnaris and to abduct or oppose the little finger.

The paralyzed hand shows an atrophy, most marked in the first dorsal interosseus space and to a lesser degree in the other interspaces. A "claw" hand, due to unopposed action of the common extensor, is the result. There is atrophy of the hypothenar eminence.

The patient cannot oppose the little finger to the thumb or move the middle finger from side-to-side. He cannot form a cone with the fingers and the thumb. Paralysis of the adductor pollicis and the flexor brevis pollicis results in an inability to hold a piece of paper or a flat note book between the thumb and index finger. The patient flexes the second phalanx of the thumb and presses the tip awkwardly against the outer margin of the first phalanx of the index finger. This is the so-called "ulnar paper sign." The individual cannot "flip" a match or cigarette.

Supplementary Movements. Flexion of the distal and proximal phalanges of the ring and little finger is performed by the two inner tendons of the flexor profundus digitorum and the two inner lumbricales. Imperfect flexion of these phalanges may be obtained through the flexor sublimis. Inability to extend the second and third phalanges of the ring and middle fingers is rare despite interosseus muscle paralysis. This is probably due to the innervation of the first and second dorsal interossei by the median nerve. Passive extension of the second and third phalanges is obtained by flexion of the proximal phalanges which shortens the interossei. If the interossei are paralyzed, and the lumbricales preserved, contraction of the long common extensors may exert a pull on the inert interossei and produce extension of the second and third phalanges and be mistaken for evidence of recovery. The extensor pollicis longus may help replace the paralyzed adductor. Abduction of the fingers from the midline may be obtained by forced extension of the first phalanges. This is especially true of the index and little fingers.

Sensory Symptoms. Marked sensory loss occurs even when the wound has not produced a total section of the nerve. In a complete paralysis sensory loss occupies the ulnar border of the palm, the palmar and dorsal surfaces of the little and the ulnar half of the ring finger. At times the whole ring finger and the ulnar half of the distal phalanges of the middle finger are involved.

The area of isolated sensory loss after overlap is much smaller, ordinarily occupying the whole of the little finger.

Vasomotor, Secretory, and Tropic Changes. The skin over the affected area is often cold and dry. Muscle and bone atrophy may be marked. Ulcerations may be seen at the site of burns.

Partial Lesions are related to the level of injury and to the extent of the lesion.

Order of Recovery is generally flexor carpi ulnaris, flexor profundus digitorum, and last the small hand muscles. Pitrès test of recovery is demonstrated by the ability of the patient to move the little finger from side-to-side and then scratch the top of the table with this finger nail while keeping the other fingers abducted and the hand flat.

Sensory Recovery. This frequently lags behind motor recovery when the latter begins. When sensory recovery has occurred motor return can generally be demonstrated.

COMBINED MEDIAN AND ULNAR NERVE LESIONS

Motor Symptoms. This is a common lesion. The wrist is hyperextended and the hand inclined to the radial side. An "ape-hand" is present. The first phalanges are slightly extended and there is some passive flexion of the last two phalanges. Marked wasting of all the small hand muscles occurs. No flexor movements are possible except those due to supplementary motility, no movement in the little finger, and the only movement of the thumb being extension and abduction in the plane of the palm.

Supplementary Movements. Slight passive flexion of the wrist is obtained by hyperextension of the hand with sudden relaxation. Slight abduction of the fingers may be obtained by strong extension.

Sensory Involvement is extensive. Tactile sense is lost over the area representing the distribution of both nerves; that is, over the palmar and dorsal surfaces of all the fingers except the area supplied by the radial nerve

and the ulnar border of the hand. Dissociation of sensation is characteristic, the area of isolated sensibility being over the distal phalanges of all the fingers.

Vasomotor, secretory, and trophic changes are common.

Signs of motor and sensory recovery follow the usual pattern.

SCIATIC NERVE

This is injured by gunshots, stab wounds, directly, in fractures, dislocations of the hip, deep injections into the hip, in "stretching" the nerve, and other ways. It is also affected by alcoholic polyneuritis. It may be the site of a mononeuritis due to osteoarthritis of the spine or sacro-iliac joint. Frequently symptoms of injury are referable to its large branches, the peroneal and tibial nerves.

Motor Symptoms. Because the nerve to the semimembranosus and tendinosus is given off high, paralysis of flexion is rare. Some weakness of the remaining flexors of the thigh may be made out. When the patient stands, the foot dangles. A steppage gait is used to overcome the foot drop. All the muscles below the knee are paralyzed. Running is impossible. Fibrosis and shortening of ligaments increases the disability. Atrophy may be concealed by edema. The knee jerk is preserved, the ankle jerk absent. The plantar reflex is absent.

No supplementary movement of the foot is possible in complete lesions. Sensation is lost over the entire foot except over the inner border of the arch and the inner malleolus. It is lost over the dorsum, over both sides of the heel, and the outer side of the leg to the knee. In incomplete lesions sensory disturbances are minimal.

Vasomotor and Trophic Changes. As a result of ankylosis, injury to the sole is common. Vasomotor changes with trophic disturbances make healing difficult. Edema and discoloration of the foot are common. Plantar hyperkeratosis may occur. In partial lesions the peroneal division suffers greater damage.

Recovery. The tibial nerve group generally recovers faster than the peroneal. The flexors and the extensors of the toes usually recover last.

Sensory Recovery. Spontaneously recovering lesions reveal good motor return with poor sensory recovery.

Painful Lesions are seen in partial lesions which show an injury to the tibial nerve. They resemble the lesions of causalgia of the median nerve.

PERONEAL NERVE

This is frequently injured in trauma about the knee. A lesion of this nerve produces foot drop and a drop of the first phalanx. Extension or dorsiflexion of the proximal phalanges is impossible. Abduction of the foot cannot be performed; steppage gait is characteristic.

Supplementary Movements. Strong contraction of the toes may result in inversion and slight dorsiflexion of the foot.

Sensory Symptoms. Objective sensibility is destroyed over the dorsal surface of the foot and the anterior and outer surface of the leg. The area of exclusive supply of the peroneal nerve consists of a narrow band which extends from a point a little above the junction of the lower and middle thirds of the leg, diagonally across the dorsum of the foot, to a point over the middle of the metatarsal bone of the big toe. It is interrupted at the junction of the middle and lower thirds by an area sensitive to pin prick.

Lesions of the deep or superficial divisions of the peroneal nerve may occur.

Order of Muscle Recovery is generally tibialis anticus, extensor digitorum longus, and the peronei.

Sensory Recovery frequently show rapid return of pain sensibility.

TIBIAL NERVE

This is injured chiefly in lesions below the popliteal space.

Motor Symptoms. Paralysis of plantar flexion of the foot is the most common finding. Frank adduction of the foot is also impossible. The toes cannot be flexed or separated, and no muscle can be moved in the sole. The foot is edematous and discolored. Walking is difficult. Hyperkeratoses and ulceration are common. Fibrosis may deform the foot. Dorsal flexion of the proximal phalanges results in clawfoot.

Sensory Symptoms. Causalgia is not infrequent, especially in partial lesions. Objective sensibility is lost over the sole, except at the inner border, the lateral surface of the heel, the plantar surface of the toes, and at times part of the distal phalanges. The overlap may remove from this designation the inner border of the sole, part of the lateral surface of the heel, and occasionally the plantar surface of the area between the toes.

Vasomotor and Trophic changes are like those of the sciatic nerve.

POSTERIOR TIBIAL NERVE

These lesions are frequently the result of injuries to the calf which produce a paralysis of all the muscles of the sole. Causalgia frequently accompanies the lesion. Contractures are common. Dissociated paralyses may occur in incomplete lesions.

TREATMENT OF PERIPHERAL NERVE LESIONS

In the presence of a complete interruption of the nerve there is no exact way of determining anatomic or physiologic interruption. An incomplete lesion may be revealed when subsequent examination reveals some return of function, motor, sensory, or electrical stimulability.

Evidences of spontaneous recovery are: (1) pain on pinching in the sensory area supplied by the nerve, (2) formication on pressure over the nerve below the level of the lesion, (3) spontaneous aching in certain muscles, (4) cessation of muscle atrophy and return of tonicity, (5) disappearance of objective sensory disturbances, (6) return of voluntary movements, and (7) the disappearance of the "reaction of degeneration."

In general if there is no evidence of recovery after four to five months, an exploratory operation should be done. Of course, anatomic severance of a nerve should be promptly repaired because the best results are obtained by early clean, end-to-end suture. It is best to do this even if the wound subsequently becomes infected because the ends of the nerve are in opposition and anchored for a secondary neurolysis which may be necessary. Even in infected wounds it is well to anchor the ends together early to avoid retraction of the nerve and burying of the ends in scar. Secondary suture is delayed for twelve weeks after the wound has become clean. In the presence of a fracture, the nerve injury had best be left alone until the fracture is healed firmly. Where there is extensive loss of skin and soft tissue it is best to wait a while with the nerve suture to obtain a healthy bed for the nerve. If after a reasonable period following end-to-end suture, no recovery occurs, exploration should be carried out. One should wait at least nine months before operating a second time.

The best surgical repair is an end-to-end union. This may require splinting the limb in a certain position for a while, or changing the course of the nerve to bridge the gap. Where there is inadequate nerve, transplants or grafts, nerve implants, nerve crossing, nerve flaps, suture à distance, and tubular suture may be tried.

General and Post Operative Treatment. While the above discussion describes the immediate care of a peripheral nerve lesion, the ultimate result is going to depend to a great extent on the follow-up care of the case. In partial lesions this may be the only care needed.

Physical Therapy. This is perhaps the most important single therapeutic factor. Stretching the tissues actively or passively results in the movement of lymph, blood, et cetera, with resultant improvement in nutrition of these tissues. Tendency to fibrosis and contracture is diminished. Passive movements may be started two weeks after a nerve suture. There is no danger of rupture of the connection. Massage is to be started as soon as possible. These two procedures prepare the muscle and adjoining tissue for function when recovery occurs in the nerve. Movements should be carried out slowly, gently, and carefully, each muscle group individualized. When the muscle begins to function, graduated exercises are started and increased to the point where the patient is carrying out specific, yet interesting exercises like typewriting, piano playing, and games.

Before massage is begun, it is well to get the part thoroughly relaxed with some form of heat, dry or wet. It is important not to burn the patient who has a yet insensitive cutaneous area. The whirlpool bath is of great value because it combines heat with gentle massage while relieving pain.

In massaging, especially in the deeper type, with the transition to kneading, it is important not to traumatize the soft yielding muscle, particularly by compressing it against bone. Similarly a sensitive recovering nerve should be protected. Ankylosed joints, contracted joint capsules, shortened tendons, all must be worked loose to improve the motion of the affected part.

Electrotherapy. This is designed to prevent atrophy of muscles and fibrosis, to increase nutrition, and to conserve the functional capacity of the paralyzed muscle until sufficient nerve regeneration has taken place to permit of active motion. Quite a controversy has raged for years in neurologic circles as to the efficiency of such treatment. The weight of the evidence, particularly clinical, would indicate that electrotherapy, properly administered, results in decreased atrophy and possi-

bly a more advanced type of nerve regeneration. Stimulation of a muscle by electricity results in a contraction. This activity preserves the bulk of the muscle and prepares it for voluntary movement. Obviously, if the faradic current produces no contraction, the galvanic must be used as such or as a sinusoidal current. The fact that the galvanic current produces a single quick twitch is no contra-indication for its use. Such contractions are safe two weeks after the injury or surgical procedure. Before this time the muscle is fragile and bruises easily—or the suture-line of the nerve may give. Since galvanic current is occasionally painful, sinusoidal current is of advantage in treating children and sensitive people. Prolonged stimulation with continuous current is useless because contraction occurs only at make and break. During the first few months after injury, while the muscles are hyperirritable, unipolar stimulation will produce contraction in the muscles most affected by the weak currents because of "longitudinal stimulation." One must not fatigue these muscles. The patient frequently cannot tell because his deep muscle sense may be defective. Later bipolar stimulation may be used because the unipolar may now produce contraction in healthy muscles, injurying the weak.

Because of the frequency of polar inversion, the positive, less painful pole should be used as the active electrode. To avoid fatigue the muscle must not be made to work against gravity. Therefore, in electrotherapeutic procedures, the patient's extremities should be fully supported.

Contraction of the muscle by electrical stimulation is an adjunct in re-education in that the patient "re-learns" a movement which he may not be able to initiate but which he can sustain. Active movement is to be started only when the nerve has recovered (1 millimeter per day). Care must be exercised not to burn the skin of the affected limb with the electrode. When the nerve has recovered sufficiently so that there is a response to faradic current, both galvanic and faradic stimulation are used, the latter to produce prolonged tetanic contractions.

Splints. These are used to prevent overstretching of paralyzed muscles and to maintain as nearly as possible the normal range of the joints and tendons of the affected extremity. Every splint should be adjusted for the individual case. Fixed splints with physical therapy are probably superior to mobile splints. The splint should be light, easily applied and removed, inexpensive, and inconspicuous. Splints must be changed from time to time to suit the change in the condition. For fixation after operation, starched crinoline is probably as good as plaster and is much lighter. When joints are fibrosed and muscles stretched in old injuries, special splints, sometimes with elastic traction are necessary.

Cerebral Palsy: A State Responsibility

Elma R. Harrison, R.N.

"It is probable that injury of the central nervous system during birth accounts for more than half of the deaths of viable babies. Furthermore such injuries are responsible for the disability of more children suffering from organic diseases than any other single etiological factor except poliomyelitis." To Dr. Bronson Crothers[1] of Boston, Massachusetts, goes the credit for the above statement.

In 1927, Dr. Crothers invited Elizabeth Evans Lord to make a psychological appraisal of the cases treated in the muscle training clinic of the Children's Hospital in Boston. During a nine year period, 300 cases of cerebral palsy were examined and followed. In a recent publication[2] Dr. Lord gives some excellent suggestions in regard to the procedure which should be used in an educational program for these children. Studies like Dr. Lord's are invaluable because they present scientific data which are essential in the planning of a program for these children.

At the present time, there is no universally

Supervisor of Field Nursing Services, Division of Services for Crippled Children, Minnesota State Board of Control, St. Paul, Minn.

accepted method of treating children with cerebral palsy. Dr. Lord makes the statement that the diagnosis and plan for treatment of the physical condition is primarily medical; the successful outcome of that treatment may be in a broader sense psychological and educational. Due to a lack of understanding of the problem and also a lack of facilities with which to work, the medical profession and the department of education have failed to unite their efforts to meet the problem, with the result that it still remains an individual family responsibility. Any progress which has been made in the development of a program for their care can be attributed to individuals and private organizations. It is obvious that their efforts cannot be extensive enough to produce far-reaching or effective results.

The high incidence of cases plus the nature of the disability offer a challenge which, it would seem, could be met only by the establishment of a boarding school or an institution which is supported by public funds. Specialized workers in the respective fields involved would be necessary and a period of experimentation which was conducted long enough to obtain conclusive data on the value of such a program would be essential.

The Social Security Act through its grants to states for the extension of services to crippled children may be the means by which such a program could be carried out. The state register which has been set up makes it possible to obtain more complete information on all types of crippling conditions than has ever been possible before. Not enough time has elapsed since the bill became effective to gather sufficient statistical material to make a report which presents the problem in its true light. Certain facts have been obtained, however, which at least show the size of the problem and suggest ways by which it may be approached.

In Minnesota, on October 1, 1937, there were 8500 crippled children on the state register. One thousand one hundred and seventeen of these children have a diagnosis of cerebral palsy. Six hundred and twenty-eight of them at some time have been under the medical supervision of one of the three hospitals for crippled children in the state. The educational problem has been a local responsibility. Most of the children with the more severe type of cerebral palsy have not attended school, as their disability made it impossible for them to fit into the regular school system.

The parents not only have to devote a large part of their time to the physical care of the handicapped child at the expense of the normal children in the family, but they are living in constant apprehension as to what will happen to him when they are gone. Their one alternative is to commit him to the State Board of Control and eventually he is sent to the institution for the feebleminded. Most of the parents dislike having their children committed, not so much because they object to having the child taken from them, but because of the stigma which they think it places upon them and the fact that they are promised only custodial care.

In the institution for the feebleminded in Minnesota, there are around 300 children with cerebral palsy. It is very probable that there are children in this group who could benefit by educational training.

In view of the fact that so many of these children eventually become the responsibility of the state, it seems entirely plausible that an institution designed specifically for their care might be considered.

Before establishing such an institution, however, certain preliminary steps should be taken.

In the first place, all of the cases on record would have to be analyzed individually to determine the need for institutional care. There are many children with cerebral palsy who have an involvement of only one or two extremities with no mental deficiency. Most of these children are able to cope with normal situations as well as any other physically handicapped child. These children definitely are not institutional cases. It is the child who has an involvement of all his extremities with or without mental deficiency who should be considered for special treatment.

The second step in the procedure should be to obtain adequate mental tests. Dr. W. M. Phelps[3] in a paper on birth injuries states that "it has been found that by no means all of these (children with spastic paralysis) are feeble-minded. Of course, a great many of them are retarded since, in the first place, because of their handicap they do not have the advantages that other children have, and in the second place (which is more important), they have had the handicap since birth. This puts them in a different category from the infantile paralysis group in whom the primary action patterns were formed before the paralysis set in and recovery does not involve

teaching primary action patterns. If a child had infantile paralysis the day he was born, the condition might be more similar.

"All tests for intelligence are dependent upon a motor response of some sort, even if it is simply a smile or a grimace; so that the response to any test given will be modified, depending upon the motor handicap present."

Elizabeth Lord[2] in her chapter of the mental testing program says: "In a testing program for cerebral palsied children, one need not be particularly concerned with the mental age, although certain Stanford Binet tests are used at times because the complete score on the Stanford test derived from a variety of tests may conceal the abilities and disabilities which are the crux of the educational problem. If the testing program is to have any practical value, it must bring out these variations in achievement so that the parent, doctor and teacher can understand why a child who seems bright to one person seems stupid to another. In what type of situation does the child function adequately? Where does he fail? In what school subjects can we expect progress? Why does he profit by one type of instruction and fail to progress under another system? The test situations are objective diagnostic aids in answering such questions as these if they have been supplemented by the mother's report and confirmed by the response to teaching. Prediction is possible only when data have been accumulated from detailed records covering many years. A relatively small group of cases, provided they include a wide range of physical efficiency and mental capacity and are carefully studied over a long period, will probably give a clearer picture of the mental development of children disabled by cerebral palsy than a cross section of a large number of cases examined only once."

Mental tests which have been taken on children with cerebral palsy in the rural areas in Minnesota by the Research Division of the State Board of Control show an intelligence quotient which varies from 10 to 70 with a few exceptional cases over 70. A child with an intelligence quotient of 70 or less is considered feebleminded.

If the results of the mental tests on children with cerebral palsy are analagous to those taken on all other children, there is no further indication for treatment.

Dr. Phelps[3] pointed out that many of these children are retarded because they do not have the advantages that other children have. Special tests repeated often enough to determine their reliability should be a part of the program.

Again quoting Dr. Phelps,[3] "It is important to classify these cases with regard to their intelligence, because if the intelligence is obviously impaired, there is no use in treating them."

The third step in the procedure is to arrange for a thorough physical examination of each child. This should include careful examination of the eyes, ears, nose and throat, and a neurological examination with an encephalogram. Any other procedures indicated also should be given.

The results of the complete physical and mental examination should determine the type of treatment which each child should have. One child who was recently examined at the diagnostic clinic at the University Hospital as a part of the program of the Division of Services for Crippled Children was found to be almost totally deaf. The parents had not been aware of the patient's difficulty and the child had been considered feebleminded.

The preliminary examinations which have been described are of no avail if provision is not made to carry out the recommendations.

An institution in which these children could live as normal lives as is possible considering their handicap should be the aim. A well-rounded program which includes academic work, muscle re-education, association with other children, recreation and vocational guidance should be given. It would make for happy, useful citizens instead of helpless, pitiful masses of humanity who become more and more of a burden to their parents as they grow older.

A child who is responsive to treatment should be permitted to remain in the institution as long as he lives, if he so desires. The purpose of the institution should not be primarily to prepare these children to compete with normal individuals, but to create an environment in which they could live the most abundant lives.

Contrary to the general opinion that a child with a physical handicap should be allowed to take part in normal activities with normal individuals, the disability of the child with the severe type of cerebral palsy except in a few rare cases makes such a suggestion impractical. There is no cure for the child who has cerebral palsy. He has his disability as long as he lives. There have been cases where the

adjustment has been made and the individual has been accepted by society.[4] It would seem to be too much, however, to ask of most children with this condition. People do not mean to be cruel or thoughtless, but it is the exceptional person who does not become disconcerted at the sight of the incoordinated movements of the person with marked cerebral palsy. The child so afflicted, on the other hand, is extremely sensitive to the reactions of the people he meets. In spite of any determination he may have to ignore them, he is constantly aware of the efforts that are being made, with the result that he becomes a thoroughly unhappy person. How much better it would be for him to live in a world which was adapted to him and in which he could be made to feel important.

The Bill of Rights for the Handicapped Child[5] which was adopted by the White House Conference in 1930 applied to all handicapped children but seems to be particularly fitted to the child with cerebral palsy. It reads as follows:

The handicapped child has a right:

1. To as vigorous a body as human skill can give him.

2. To an education so adapted to his handicap that he can be economically independent and have the chance for the fullest life of which he is capable.

3. To be brought up and educated by those who understand the nature of the burden he has to bear and who consider it a privilege to help him bear it.

4. To grow up in a world which does not set him apart, which looks at him, not with scorn or pity or ridicule—but which welcomes him, exactly as it welcomes every child, which offers him identical privileges and identical responsibilities.

5. To a life on which his handicap casts no shadow, but which is full day by day with those things which make it worth while, with comradeship, love, work, play, laughter, and tears—a life in which these things bring continually increasing growth, richness, release of energies, joy in achievement.

SUMMARY

1. The high incidence of cerebral palsy among crippled children plus the nature of the disability indicate a need for special consideration of the problem.

2. The treatment of the cerebral palsy patient is both medical and educational which calls for a united effort to establish a program to meet the need.

3. Credit is given to private agencies and interested individuals for making the greatest contribution to the progress which has been made in the development of a program for the care of children with cerebral palsy.

4. Extension of services to crippled children through the Social Security Act has opened up new avenues of approach to the problem.

5. A plan of procedure for the establishment of a special institution include the following considerations:

(a) Analysis of the cases on the state register and the selection of children in need of special institutional care.

(b) Adequate mental testing of all children selected for treatment.

(c) Complete physical examination prior to admission to the institution.

(d) Special equipment and skilled personnel in the institution which will make possible a well-rounded program which includes custodial care, academic instruction, muscle reeducation, recreation and vocational guidance.

(e) The patient should be given the right to live in the institution as long as he desires provided he shows the ability to respond to treatment and is happy in that environment.

REFERENCES

1. Jacobson, A. W.: Observations by a Pediatrist Concerning Two Types of Crippled Children Frequently Referred to the Physiotherapist. The Physio. Rev., Vol. 17, No. 3, May-June 1937.
2. Lord, Elizabeth Evans: Children Handicapped by Cerebral Palsy. The Commonwealth Fund, New York, 1937.
3. Phelps, Winthrop M.: Birth Injuries. The Physio. Rev., Vol. 17, No. 1, January-February 1937.
4. Bretscher, T. A.: The Fate of the Birth Injured, The Physio. Rev., Vol. 14, No. 1, January-February 1934.
5. White House Conference Reports, The Century Company, 1930.
6. Statistical Report, Division of Services for Crippled Children, Minnesota, 1937.
7. Biennial Report of the State Board of Control, Minnesota, 1936.

Is There Hope for the Crippled Adult?

Edward T. Evans, M.D.

Strange and perhaps portentous times are with us. Regimentation has become almost a by-word in many walks of life. Legislation regulates or tries to regulate the conduct of the masses. Even though our futures may not be dictated to us by new regulation, it is inconceivable that our plans will not be tremendously altered.

Industry has been severely criticized in the past for its failure to absorb into its scheme of things the physically handicapped, yet the very nature of the restrictions placed on industry in meeting production demands called for maximum efficiency not only in the actual production but also in the strict accounting necessitating low overhead, minimal insurance risks, and maximum application of time. These factors excluded from competitive labor many capable of the actual labor but incapable of the highest efficiency.

Into the National Recovery Administration, therefore, was written the proviso whereby adjustment of wages for handicapped workers was permissible, — a good measure but lacking in force because of the huge numbers of available workers not so handicapped. It has perhaps prevented the discharging of tried employees for physical reasons but it has not aided in the placement of new.

The government itself, in its civil service, demands the highest physical perfection and, despite political patronage and influence, regular responsible positions are seldom filled by the physically handicapped, no matter how proficient he may be in his chosen vocation.

The Emergency Relief Administration, magnanimous as it is in conception, classifies its workers in this community as physically perfect skilled labor, physically perfect unskilled, and handicapped skilled and unskilled labor. Yes, but if those handicaps are even more than slight, if the past history suggest possible, not probable, inability to carry on at full efficiency, the risk is considered greater than the benefit to the job and that case is relegated to direct relief or the dole.

Does it surprise you to know that Class A averages in the early thirties, Class B in the late thirties, and Class C, the men who applied for work and were relegated to relief, in the forties. Industry bore its risks more graciously.

But this is not to be political. I merely cite these facts to impress upon you that in considering the placement of the handicapped individual many hurdles must be overcome.

I do not believe we can look to legislative aid. I do not believe the handicapped adult should or can be regimented.

There are, of course, certain fundamental responsibilities which the community owes to its disabled. By community, I mean first the immediate family of which he is a part, and only when the family fails for unremediable reasons should he become a care of the local state or federal organizations, philanthropic or governmental.

I stress this because I believe strongly that all too often the dependency upon free help breeds irresponsibility and stifles ambition. I see it daily in a certain large class of cases at the United States Veterans' Bureau.

Praiseworthy though the work of the private, local, state, or federal agencies may be, it cannot be denied that impersonal regimentation is inseparable from it and the recipient suffers a loss of individuality and may be even further handicapped.

Did I hear someone say, "Then what about Roosevelt, or our own Mr. Eustis?" Granted, but I answer that in any group there are always those who will literally lift themselves by their own boot straps and achieve their aim. And I am not so sure they would have gone so far if they had not had their independence.

I was recently reliably informed that over one hundred former Gillette State Hospital patients were enrolled at the University last year. This is a great tribute to the conduct of that institution, to the opportunities it afforded and to the fostering of ambition within its walls. Does this group, however, represent any greater proportion of the whole than

Assistant Professor of Surgery, Orthopedic Division, University of Minnesota, Minneapolis.

Read before the Minnesota Association for Crippled Children and Disabled Adults at their annual meeting, 1935.

graduates from high school in our civilian population?

What we should more seriously question is "What is their relative employability or placement on graduation?"—because their problem, though they have had higher education, is the same as of those less fortunate.

And again we might rightly ask, "What of the vast majority who did not go on to the University?" What factors govern their ambition, what influences failed to develop initiative, and even more important, did recent environment militate against what would have otherwise been a normal development of these forces?

Why are the records of the Veterans' Bureau filled with cases, originally endowed with all opportunity, unable to cope with their present environment although their brothers and sisters did not so suffer? Is it a fault of the system, or do you blame the individual?

I have purposely painted a relatively dark picture because it is not the occasional remarkably successful battle of the genius against odds that is the criterion of the efficacy of our system, nor can we utilize his environmental factors as a pattern for our future course. We must consider the average and subaverage individual.

If then we admit that industry as we know it today requires efficiency in its fullest sense, implying skilled labor capable of competing without added overhead, where does our crippled adult fit in?

Is he to be relegated to a dole? Is he to be dependent on his community rather than his own earnings? He may be if opportunities are closed to him. He most certainly will be if industrial regimentation continues to neglect his rights for an equal opportunity.

How is he to be given that opportunity?

In the first instance, by the fostering and development of his independence, initiative, and ambition accomplished by the judicious application of individual rehabilitation in a proper vocation. These are properly the duties of those organizations entrusted with his care. The result will be directly proportionate to the environmental factors set up by the organization.

Excepting, then, those physically or mentally hopeless, we should no longer speak of the adult crippled. He is rehabilitated and ready to assume his rightful place in society.

In the second instance, and herein lies one of the great potential values of a society such as this, by a strenuous carefully directed educational campaign which will convince employers that the rehabilitated case is peculiarly capable of filling responsible positions or of actively following his particular vocation. He is no longer a cripple, his physical rehabilitation is prima facie evidence of his ability. His triumph over his handicaps insures his future and with certain restrictions renders him an excellent industrial risk.

Such an attitude on the employers' part will render future dividends and help to preserve our fundamental American principle that "all men are created equal."

In the latter half of the tenth century (the Heian Period) the subject of hygiene was thoroughly considered by the celebrated physician, Yasuyori Tamba, in his book "Ishinho," which is in twenty-six volumes. It was composed chiefly of articles on exercise, sleep, work, diet, speaking, clothing and housing. . . . The most important things in the care of the body were massage, gymnastics, deep breathing and baths.—*From "JAPANESE MEDICINE" by Y. Fujikawa, M. D.*

Residual Neuromuscular Hypertension: Implication For Physiotherapy*

Part V: Possible Causes as Well as Consequences of Excess Tension

Josephine L. Rathbone, Ph.D.

To this point in the analysis of the causes of residual neuromuscular hypertension a good deal of evidence had to be drawn from the observations of other investigators. Evidence was not lacking altogether in our own cases, but the arguments for the causal connection between the various factors discussed and residual neuromuscular tension were not as convincing as other observers had indicated. In the discussion of the next three topics—pain, emotional disturbance, and activity drive—there was abundant evidence, however, from our own observations to support the thesis that they are important factors in residual neuromuscular hypertonus.

Pain. Before discussing the pain symptoms presented by our cases, it will be interesting to consider a theory concerning pain advanced by Crile. He says, "When one reflects on the vast amount of evidence as to the origin and the purpose of pain, he is forced to conclude that pain is a phenomenon of motor stimulation, and that its principal role is the protection of the individual against the gross and the microscopic enemies in his environment. The benefits of pain are especially manifested in the urgent muscular actions by means of which the body moves away from physical injury; obstructions of the hollow viscera are overcome; rest is compelled in the acute infections—the infected points are held rigidly quiet, the muscles of the abdomen are fixed, and harmful peristalsis is arrested in peritonitis; while there is absolutely no pain in the diseases or injuries which affect those regions of the body in which in the course of evolution no pain receptors were placed, or in those diseases in which muscular inhibition or contraction is of no help. In a biologic sense pain is closely associated with the emotional stimuli, for both pain and the emotions incite motor activity for the good of the individual."[1]

In discussing the pain experienced by our subjects, it was necessary to distinguish between different possible causes. When a physician had diagnosed arthritis, neuritis, or myocitis—inflammation of joints, nerves, and muscles, respectively—it was necessary to give due consideration to this explanation for the pain. When the individual had had acute or chronic trauma, the specific consequences of the violence or static strain had to be recognized and relieved. When other causes of pain had been eliminated, it was necessary to inquire into the possibilities of increased sensitivity as the result of increased muscular tension alone.

Unnecessary and superfluous tension will cause pain. Even visceral pain is due to "tension on the splanchnic nerve endings in the muscular walls of the hollow viscera."[2] Apparently, oxygen want contributes an important cause of all pain,[3] and the muscular tension must be released before the circulation can pass unrestricted and the pain can abate. Any improvement in circulation, therefore, brought about by heat, massage, or mild rhythmic exercise will release the tension and relieve the pain.

Finally, in a study of our own cases, it becomes important to decide whether or not there might be a series of factors associated with pain in a vicious cycle. For may not such conditions as arthritis and trauma increase residual tension sufficiently to cause more pain than the original lesion warrants? Will the tensions developed with the bearing of any pain increase the pain? Or may muscular tension by itself, from any other cause,

Teachers College, Columbia University, New York City.

*Residual Neuromuscular Hypertension: Implications for Education, by Josephine L. Rathbone, Ph. D., published by the author, New York City, 1936.

bring about symptoms like those usually ascribed to inflammation and injury?

This article is not an appropriate place in which to discuss at length the several cases of arthritis, neuritis and myocitis which were referred to our corrective physical education clinic by physicians. They are treated at length in the published dissertation.

While discussing arthritis, however, in fairness to the most recent work on that subject, it must be recalled that Pemberton and his co-workers have recognized a relationship between the symptoms of chronic arthritis and "nervousness." They list neuromuscular tenseness as a symptom of arthritis. Is it possible that arthritis may be a symptom of general neuromuscular hyper-excitability? As Jacobson emphasizes, "nervous hypertension may be responsible for an actual, not merely an imaginary, increase of pain."[4]

In discussing pain, as the result of trauma, it will be necessary to consider both acute and chronic strain. The manner in which pain causes residual neuromuscular hypertension is not fully understood, but that the two conditions are inseparably linked together there is no doubt. Skillful masseurs and osteopaths have long recognized this fact. When a patient complains of pain, and yet the attendant can find no muscular tension, the condition is to be dismissed as largely imaginary. When, on the other hand, the operator finds an area of muscle tenseness, the patient does not have to tell him whether or not that region is painful. His fingers tell the operator that such is the case, and he goes to work to release the tension and thereby the pain.

Apparently, whenever any part of the body is wrenched, the muscles in that region contract tonically in order to hold the body segments as still as possible, in order to prevent more pain. The reaction is purely reflexive. Any gripping of the wounded part, or any automatic rubbing or rhythmic swinging of the part after the pain has become perceived is a simple, natural device to try to release the tension. All that artificial therapy can do for pain, besides getting at its cause, is to assist nature by adopting her own methods — heat, massage, and exercise—as well as conscious relaxation.

The spasmodic contractions of muscles following an acute injury may be localized or wide-spread in the body and are likely to persist longer than necessary to save the injured part from jarring. A circumstance which aggravates the muscular condition following all acute injuries seems to be fear of being hurt again. Even when a traumatic lesion is given the best possible orthopedic care, there is some pain. Naturally the victim does not wish to experience that sensation again. Acquaintanceship with injured individuals indicates that the fears accompanying traumas are complicated. In industrial accident cases, as all insurance adjusters know, the fear of incapacity is often transferred consciously or unconsciously to a hope of not having to work again and of being taken care of "by the company." In the case of those who really enjoy physical activities, however, the fear of recurring injury and subsequent incapacity may be considered non-pathologic.

It is easy to understand the manner in which fear of pain can cause tonic muscular contraction. It is less easy to understand how other fear states may cause the same consequences, although observation supports the contention that they do. All fears arrest movement and cause residual musclar tonus. Fears set the individual against his environment physically, as well as psychologically.

The cases studied for the dissertation here reported have emphasized for the investigator certain principles concerning the treatment of acute traumas: (1) Prevent or treat any muscular spasms which may develop after joint injury. They will augment the pain. (2) Prevent as much static strain as possible after any injury. Static strain superimposed upon acute injury will increase the consequences many fold. (3) Never recommend that an injury, however mild, go unprotected until the ultimate range of motion has been established. Whereas a taut ligament or tendon will be subject to recurring injury when placed on severe strain, an unstable unprotected joint will cause unlimited difficulty. (4) Treat the injured individual as a whole personality. Try to keep from him such knowledge about his condition as will cause him undue concern, and counteract every possible source of neuromuscular hypertension, psychologic as well as physical.

When one considers chronic, static strain, in contrast to acute trauma, one is impressed even more with the close relationship between residual muscular tension and pain. The usual acute trauma has as its most serious consequences actual joint subluxations and ligamentous tears. The muscular spasms come as a consequence of a reflex reaction aimed at keeping the segments immobile in order to prevent joint irritation. Most chronic or

static strain, on the other hand, is an involvement of muscles primarily. For example, when feet are subjected to static strain, because of habitual pronation or superimposed weight, the strain is usually felt first in the intrinsic and extrinsic muscles of the foot. Only when the muscles give up their burden does the pain become localized in specific joints.

In summarizing the interrelationship between pain and residual tension, certain definite principles should be restated. Although pain is perceived by the brain—the highest part of the nervous system, it is received by the sensory nerve endings—the lowest part of that same system. Although it may appear to the unsympathetic observer that the pain is highly exaggerated, it must still be accepted as having a physical basis. Furthermore, as Alvarez has warned, "The truth of the matter probably is that nervous patients commonly do suffer more intensely and more continuously than do persons with organic disease . . . and there is every reason to believe that a greatly increased irritability of the nervous system should cause much suffering."[5]

That increased irritability may appear under certain conditions in patients who are not "nervous" is a well known fact. The cases analyzed for this study demonstrated that tonic contraction of muscles, in an effort to prevent movement following acute trauma, or to prevent recurrence of chronic pain, will cause enough increased irritability to contribute to more pain. Therefore, it will be desirable in every way to relieve initial pain whenever it occurs and to keep strained muscles relaxed. An efficient method for getting rid of pain appears to be to relax it away.

Emotional Problems. In discussing the effects of emotional disturbances, per se, upon the muscular system, an effort will be made to cling to the evidence provided by the data assembled during this investigation. Too much credence cannot be given to the vast amount of literature bearing on the importance of psychologic adjustment and physical well being, because a great deal of unscientific information has been offered on this phase of the topic under consideration.

There is no doubt that there are somatic manifestations of psychic disturbances, because mind and body are so intimately related. "Motility, sensibility, glandular activity, metabolism and the subtle chemical changes underlying secretion, as well as emotion, perception, memory and thought are all manifestations of the various physiologic and psychologic levels of the nervous system in its role of centralizing the psychobiologic activities of the organism. . . . And as the psychologic level is the highest in functional importance, it has a supreme power of control and guidance over all other levels of the nervous system. This being true, it is not difficult to understand why mental states associated with anxiety, fear, depression, despair and prolonged conflict should cause disorders in other portions of the nervous system controlling visceral and somatic function."[6]

During the first year or so of this investigation of neuromuscular hypertension, every effort was made to attach some important causal significance to emotional problems in each individual case. In the light of four years of intimate association with these same cases of excessive tension, however, it was apparent that the problems revealed did not represent a unique type of experience peculiar to these individuals. One must not think that, for this reason, emotional problems have no responsibility for increased neuromuscular reactions. It may mean, rather, that they have a very significant sociologic importance in that they may be the cause of the widespread manifestations of residual neuromuscular tension to be found in the professional group studied, at least. It is to be remembered that the cases studied were selected first because of their neuromuscular tension and analyzed subsequently for their psychologic peculiarities. It might be interesting to select a group of individuals who have had avowed psychologic difficulties in order to see what their degree of neuromuscular tension might be.

The psychoneurotic tendencies associated with increased neuromuscular tension can be classified under three headings—neurasthenia or irritability, melancholia or worry, and mania or over-activity.

Neurasthenia or irritabiilty. Neurasthenia is a term which has been variously interpreted ever since it was first suggested by Beard. At present it seems to be agreed that, from the psychologic point of view, neurasthenia is a form of defense or escape—a sort of way out—that a person resorts to when facing the realities of everyday life is too hard and difficult.[7] From the physical point of view, neurasthenia represents a state of irritable fatigue[8] associated with hypochondriasis or in-

creased sensitivity. These individuals often take a "sort of morose pleasure in the abnormalities, and they would probably regret a sudden functional restoration."[9] It may be of special interest to discuss the only three cases in this series that showed marked neurasthenia. They will be called, "A," "B," and "C."

"A" had been referred by a physician who had recognized a lack of exercise and physical recreation in her scheme of life. She had complained to him of numerous indispositions, the most annoying of which was dysmenorrhea. When he found that she had a "normal" heart but a low red blood count and haemoglobin of 60 per cent, he advised general exercise as the major part of the treatment. It is possible that he was glad to pass on to someone else the nagging and complaining. "A" attended classes in corrective physical education for two years. During the first months, pains in arms and back and feet were offered the instructor each visit. When it was finally realized that a very light massage seemed to relieve the most severe pain and that the complaints were more urgent when other members of the class were receiving attention, the instructor began to consider the subject's emotional history to find a cause. She was an unprepossessing young woman whose social environment extended only to her classroom and her church. She had never been given attention by men outside her own family. A brother who shared a humble apartment with her had been out of work for months and had been adding to her burden of shame. Life was to hard for her; she needed love and care; she was tired of working for others; and she sought some attention for herself from her doctor and physical therapist.

"B" presented much the same picture. She seemed to have a gloomy disposition which had given several physicians cause for concern. Her main complaint was constipation. A well known orthopedic specialist had put a corset on her in an effort to compensate for her visceral ptosis and had recommended exercises as well. Although "B" did have a low, protruding abdomen, the muscles of her arms were particularly tense. She frowned most of the time and seemed to be constantly on guard against maltreatment. She almost cringed, as though circumstances had beaten her. This case was under observation during one summer school session only, and no effort was made to follow it since it was known that it would return immediately to the physician who had referred it. It was very apparent, however, that this woman did not wish to get well. She did not expect anything to do her good, and she "knew" that her condition was hopeless. Actually, her health had not been seriously affected, as a good skin tone testified.

The third case, "C," showed a somewhat different picture. She was a woman of about the same age as the other two discussed under this heading but was a housewife instead of a teacher. The economic struggle had not been difficult for her, as was surely the situation with "A;" but she was threatened with the loss of her husband's affection and attention. In order to gain the solicitude of her family, she developed a strange series of complaints. There is no doubt that her body exhibited marked muscular tensions. She was voluble and dynamic when in the clinic but complained of getting tired at the slightest provocation. She was very irregular in attendance, always sending lengthy excuses by phone or note, thereby trying to gain the sympathy of the teacher. Such a case should be given a series of routine examinations to discover whether or not there were an endocrine imbalance, foci of infection or any other predisposing cause of increased neuromuscular tension. Since the fatigue in this case was definitely irritable, it may have been purely psychogenic. It is particularly interesting to note that "C," as characteristic of others like her, was constantly changing doctors, who found little wrong with her, and following the suggestions of all her friends.

A definite emotional problem surely has a part in the etiology of the residual tension in the above cases. They are the only ones in this series, however, who exhibited psychogenic neurasthenia or irritable weakness from emotional causes peculiarly. The other cases were vigorous, and the majority of them were uncomplaining.

Melancholia or worry. A state of worry verging on melancholy seems to be a very common experience of the type of individuals analyzed in this study whenever they permit themselves to become overfatigued.

Knopf says, "Only a strong, stubborn and determined person, a person with a great wish to dominate, will ever develop melancholia."[10] As far as evidence from these cases is concerned, her statement holds true; and, since most of the subjects studied were from the teaching profession, the evidence is weighted

in that direction. Teachers in general must be classified as dominant individuals.

Knopf further emphasizes that an individual "is always striving for security, for adequacy, . . . for significance,"[11] and that neurotic symptoms develop as a person attempts to establish that security.[12] To be worried is to be unduly anxious or troubled, to be in a state of solicitude, anxiety, disquietude, or pain; to make oneself anxious or harrassed, to fret.[13] Among our cases three which exhibited these characteristics clearly will be discussed briefly. They will be called, "D," "E," and "F."

According to modern psychologists, fundamental impulses are sex, self preservation, and self development.[14] Any thwarting of these impulses will lead to a feeling of insecurity, inadequacy, or insignificance, and may lead to personality disorders, of which pathologic worry and melancholy are as common expressions as neurasthenia or irritability. According to popular fiction and current writings in the field of psychiatry, sexual frustration has been given prominence as a cause of emotional and physical breakdowns. From these data, however, no sweeping statement can be made.

"D" did reveal a subtle form of sexual frustration as a possible cause of her marked tension. She was the mother of three grown children who were respectful and self supporting. According to the reports of friends, her husband was dutiful and attentive. According to her own interpretation, he was not loyal to her and was always admiring younger women by glance, at least. It is to be surmised from evidence which cannot be given because it would reveal the identity of the woman that the incompatibility in this instance was definitely sexual. There is little doubt that the worry resulting from the situation was an important cause of the tension in this case.

The only observed sexual frustrations in "E" and "F" were exhibited by excessive attachment to an infant progeny in the first case, and vigorous hatred of the father in the second. From our observations, however, it appears that the thwarting in these two cases were more definitely on the score of self preservation and self development.

"E" was in a profession in which men must keep their physical vigor and in which they are superseded early by still younger men. "E" became a subject of this investigation when he had left that profession temporarily to get a higher degree. He was not confident that he would regain his position or hold it if he returned. In a completely subconscious fashion, this knowledge affected his reactions. He tried, in the first place, to keep his posture up to the A standard, as he understood it. That effort caused hypertension in the muscles of the lower trunk, especially. In the second place, he participated in as strenuous physical exercise as possible, thus straining the back because it was held so tensely. In the third place, he took upon himself the amusement and care of his infant son, a responsibility which added to his physical activity. The physical complaint was pain in the lower back which persisted for many months—all the time the case was under observation, but in less acute form after he learned how to relax. It was impossible for him to accept a philosophy of less physical effort, however, so the purely physical treatment had only partial success.

Case "F" was somewhat different from the two previously discussed, because the cause of worry and frustration avowedly went back to childhood and adolescence. Her mother, "a swell person," had died when she was a child; and the father and brother had attempted to govern her life. She had been made to feel self conscious because of an ungainly body and had never taken part in physical activities because of self consciousness. She had grown up insecure in self respect and had torn herself away from her father's home to try to make a place for herself without his support. She had developed a wall around herself, eyed everyone with disfavor and fear during the first few months she was under observation, and maintained such an open-eyed fixed stare that one suspected hyperthyroidism. After she had the pleasure of living in a normal home one summer, however, she developed a definite charm of manner and could be induced to smile bewitchingly. She gained five pounds, "by wise living," a fact which threw discredit on the supposition of hyperthyroidism.

These three cases are representative of several others in this series who were all in a state of financial insecurity, furthermore. These cases were worried about the future and were driving themselves towards the unknown, in an heroic fashion, to be sure.

As has been indicated above, although it was possible to find instances of irritability and worry among the cases analyzed, it cannot be stated that such was the general rule. When one considers the clinical histories of most of our cases, one is impressed by their

satisfactory psychologic adjustments to grave problems and staggering responsibilities. Of course, it is possible that, in spite of their being "outwardly" calm, they may have been "inwardly" seething, tense, frightened, or hypersensitive. Their muscular tenseness may have been the expression of their control. In fact it may have been the expression of a healthy state of mind at the expense of the body, an expense which would eventually react disastrously on the mind and emotions.

The strong conviction has developed during a careful analysis of our cases that somatic conditions react definitely on the psychic side of a person's nature, and that in cases like the ones studied for this dissertation a careful and thorough physical examination is as likely to explain emotional disturbances as an investigation along psycho-analytic lines is to explain physical symptoms.[15] Whereas the physiologic changes that occur during emotions are biologic adaptations of the organism to meet extraordinary situations,[16] many mental and emotional phenomena are only the result of bodily activity.[17] "Wherever there is a psychic disturbance, trained observation will reveal corresponding signs of neuromuscular hyperactivity or hypo-activity."[18] Whatever causes hyperactivity of the body will overexcite the mind. If the original stimulation of the body comes from the mind, it will the more rapidly react back on the mind and emotions.

Mania or over-activity. The acknowledged sign of the emotional disturbance which is as definitely physical as psychologic — excessive activity—was commonly observed in these subjects. In fact it was their one almost universal characteristic. Intense nervous excitement and uncontrollable activity were observed at some time in almost every case. The activity usually took the form of hectic work.

Perhaps excessive work may be explained psychologically as an impersonal focus upon which an individual may transfer his annoyance with himself or his irritability towards another human aggressor.[19] Also, it is possible that work may become an escape device during mental conflict, or a distraction device to help one to forget some undesirable situation. Work thus may become a wild mania.[20]

Experience has shown that a strong emotion can enable one to continue exertion after one seems to have reached the limit of exhaustion. This unnatural stimulation creates a false exhilaration which conceals fatigue, the overstrain becoming apparent only after one's health has been seriously threatened.[21] It is probable that "no permanent injury may result to the individual who is spurred on by a strong emotion to exertion for a short period that is beyond his ordinary powers, provided the exertion is followed by a sufficiently long period of rest."[22]

When human beings are constantly stimulated to continue work or play beyond the point where they feel fatigue, however, nature's signal to them to stop (sensation of fatigue) becomes weakened and is no longer a reliable guide. Exertion is then continued beyond the point where recuperation is normal. Fatigue sets in and the entire neuromuscular system goes into a state of hyperexcitability representing the physiologic stage preceding exhaustion. Case after case included in this study emphasized the fact that when an individual's body is driven to overexertion by emotional dissatisfactions or by fervor of any kind, the body goes into a stage of hyperexcitability from which release is difficult.

Laymen have been lead by popularized pseudo-medical writings to believe that all "nervous" tension must be due to emotional indiscretions or thwartings. Psychologists and psychiatrists have contributed to this point of view. Even physicians of the body have subscribed to the notion that any indisposition which does not fit into an explicable category or cannot be diagnosed by roentgen or bacteriological examination must be a distortion of mind instead of body. It would be more accurate to acknowledge the close interrelationship of mind and body and the effect of either upon the other. There have been physicians, of whom Weir Mitchell, Jacobson, and Alvarez are examples, who have recognized this close connection of mind and body and have used various means of quieting the body in order to bring peace to the mind as well as comfort to the body itself.

BIBLIOGRAPHY

1. Crile, George W.: Origin and Nature of Emotions. W. B. Saunders Company, Philadelphia, 1915, Pain, Laughter and Crying, p. 89.
2. Foreign Letters. Jour. A. M. A., 97:4:258 (July 25) 1931.
3. Knopf, Olga: The Art of Being a Woman. Little, Brown and Company, Boston, 1932, vii and 307 p.
4. Jacobson, Edmund: Progressive Relaxation. The University of Chicago Press, Chicago, 1929, p. 8.
5. Alvarez, W. C.: Nervous Indigestion. Paul B. Hoeber, Inc., New York, 1930, p. 116.
6. Hunt, J. Ramsey: Nature and Treatment of Psychic and Emotional Factors in Disease. Jour. A. M. A., 89:13: 1014-1017 (Sept. 24) 1927, p. 1014.
7. Pratt, C. K.: Nervous Breakdowns—A Teen Age Danger. Parents Magazine, 6:3:14, 15, 50, 51 (March) 1931.
8. Norbury, Frank Parsons: The Nervous Patient. Jour. Missouri State M. A., 29:7:307-313 (July) 1932, p. 310.
9. Franz, S. I.: Nervous and Mental Re-education. The Macmillan Company, New York, 1933, p. 33.

10. Knopf, Olga.: Op. cit., p. 231.
11. Ibid. p. 25.
12. Ibid. p. 147.
13. Reynolds, Ernest S.: Hysteria and Neurasthenia. Brit. Med. Jour., Vol. 2 for 1923:3286:1193-1196 (Dec. 22) 1923, p. 1195.
14. Barker, Lewellys F.: On the Commoner Functional Disorders Known as the Psychoneuroses; Their Recognition and Management. Yale Jour. of Biology and Medicine, 5:2: 107-122 (Dec.) 1932, p. 107.
15. Nixon, J. A.: Focal Sepsis as a Factor in the Causation of Neurasthenia and Insanity. Brit. M. J. Vol. 11 for 1925:3366:11-12 (July 4) 1925, p. 12.
16. Wechsler, D.: The Measurement of Emotional Reactions, Researches on the Psychogalvanic Reflex. Arch. of Psychology, 76:5-175 (Jan.) 1925.
17. Moss, F. A.: Common Sense vs. Magic in the Treatment of Mental Diseases. The Physiotherapy Review, 12:6: 283:288 (Nov.-Dec.) 1932, p. 284.
18. Jacobson, Edmund: Progressive Relaxation. Op. cit., p. 25.
19. Morgan, John: Keeping a Sound Mind. The Macmillan Company, New York, 1934, p. 163.
20. Ibid. p. 164.
21. Frankfurter, Felix and Goldmark, Josephine: Case for the Shorter Work Day. U. S. Supreme Court, October term, 1915, New York, p. 127.
22. Reynolds, N. L.: Rest and Sleep, Why We Need Them. National Tuberculosis Association, New York, March 1930, p. 7.

(Editor's Note: This is the fifth article by Miss Rathbone. The sixth will appear in the next issue.)

Massage in Neuropsychiatric Disorders

Gordon R. Kamman, M.D., F.A.C.P.

While doing graduate work in Europe, the writer was impressed with the fact that if there is any branch of therapy in which the Europeans equal or even excell us in America it is in the use of massage and passive motion in the treatment of nervous and mental conditions. This does not mean that their technicians are more skilled than are ours, but that their physicians better appreciate the benefits of massage, its uses, indications and contraindications. However, since the World War, and with the growth of industrial medicine in America, massage and passive motion are coming into their own, and an increasing number of physicians and surgeons are beginning to realize that physical therapy is a very useful adjunct to the practice of medicine.

For the purpose of this discussion, we will divide the subjects under consideration into neurologic disorders and psychiatric disorders. A neurologic disorder is one in which there is an actual and demonstrable change in the anatomic structure of the central or peripheral nervous systems, or both. A psychiatric disorder is one in which there is a disturbance in the mental or psychological functions of the individual. When there is a derangement in structure as well as in function (psychological) we speak of a neuropsychiatric disorder. These definitions are very broad and incomplete but will convey to the reader an idea of how these conditions are grouped.

Instructor in Nervous and Mental Diseases, University of Minnesota, Minneapolis.

NEUROLOGIC DISORDERS

It is not possible in a paper of this kind nor is it necessary to discuss separately each neurologic disease in which massage and passive motion are useful. The main general indication for this form of treatment is paralysis in any one of its various forms. What happens when an extremity is immobilized for any length of time either by paralysis or by splinting? First—atrophy. This runs parallel with the period of disuse and is sufficiently familiar to everyone to preclude the necessity of further discussion. Second—adhesions between opposing joint surfaces. Opposing joint surfaces are covered with synovial membrane and are separated by synovial fluid. After a joint has been immobile for a certain length of time, adhesions form between these opposing surfaces, and when motor power returns, the joint is stiff and painful. Third—contractures. These are the result of the replacement of muscle fibers by fibrous tissue and depend on the position of the paralyzed extremity. In some conditions such as hemiplegia the contractures appear first in certain muscle groups; that is, the flexors in the arms and the extensors in the lower extremities. Whatever the form of the paralysis, the aim is not so much to produce a favorable reaction at the site of the lesion as to maintain the nutrition of the muscles so that they may be able to respond to the action of the nerves when the functional activity of the latter is

restored. Another objective is to prevent contractures and to re-educate affected muscles.

In general, there are three kinds of paralysis. (1) Paralyses of cerebral origin. These are almost always spastic in nature and contractures appear in the anti-gravity muscles; that is, flexors in the arms and extensors in the legs. The most frequent causes of this type of paralysis are vascular lesions in the brain or cerebral birth injuries. (2) Paralyses of spinal origin. A classic example of this type of paralysis is seen in poliomyelitis. The affected extremity is cold, flaccid, atrophic, and sometimes cyanotic. Here deep effleurage and passive motion are beneficial. Eccentric (the patient resisting) followed by concentric (the masseur resisting) treatment is my usual recommendation for such conditions. (3) Paralyses of peripheral origin. These are seen in the various injuries and in neuritis. In this type of paralysis, one must wait until the acute stage is over. In neuritis, while pain is present, massage and passive motion are contraindicated.

PSYCHIATRIC DISORDERS

In dealing with psychiatric patients there are several things to be remembered. (1) Patients are very sensitive to all forms of sensory stimuli such as touch, sound, light, et cetera. (2) Patients react much more readily to unfavorable than to favorable suggestions as to their health. To relate to a psychiatric patient the harrowing details of another patient's illness is the height of folly and can do more harm than all forms of physical therapy can do good. Patients remember with utmost clarity every adverse remark made by their physicians, nurses, and physical therapists. (3) Always be on time. In psychiatry it is axiomatic that a regular routine is of utmost benefit. The author insists that, in the daily program of a psychiatric patient, the same thing be done at the same time every day. On countless occasions a nervous patient has been upset because a certain medication, treatment, or the doctor's visit did not occur when the patient was accustomed to expect it. (4) It is advisable that the physical therapist have a preliminary visit with the patient before giving the first treatment. If patient and therapist are acquainted, the fear reaction so often encountered is less likely to occur. Patients are naturally apprehensive, and any new procedure which the patient does not understand inspires fear and uncertainty. Such remarks as, "Have you ever had massage before?" or, "Your doctor prescribed this, and it is a part of your treatment," tend to dispel fear and uncertainty on the part of the patient and render the treatments much more effective.

Where does physical therapy fit into the treatment program of a psychiatric patient? First, there is no one thing that cures a patient. The treatment is a combination of therapeutic efforts. Second, four approaches are usually employed in the treatment of psychiatric disorders. These are: (1) isolation and rest, (2) psychotherapeutic interviews, (3) diet and medications, and (4) physical therapy and occupational therapy. Physical therapy, although very important, is merely part of a larger general scheme of treatment, and the therapist must realize what position in the treatment program she occupies. The same applies to the occupational therapist, the bibliotherapist (librarian), the nurse, and the physician.

Let us discuss individually some of the psychiatric disorders in which the various forms of massage have been found to be beneficial.

(1) Neurasthenia. The two cardinal symptoms of this condition are irritability and fatigue. If used inadvisedly, massage is capable of doing great harm in neurasthenia. Rubbing that is unduly severe or prolonged may accentuate the symptoms that we are trying to relieve. One has frequently seen cases of neurasthenia that were being overtreated by unnecessary medication, excessive bathing, excessive electric currents, and excessive massage. If one remembers the heightened irritability of the nervous system in these patients, one will not forget the necessity of a very gentle approach to the individual suffering from neurasthenia. The treatment should be begun with gentle surface effleurage mainly for the sedative effect. Later on deeper and more prolonged treatment may be used so that the patient is receiving considerable passive exercise. Petrissage is permissible, but tapotement is contraindicated. As the patient improves, he is gradually put on increasing doses of active exercise, so massage becomes less and less necessary.

(2) Insomnia. Gentle massage given at bed time strongly favors sleep. Severe deep massage given at first may produce local soreness, increase the heart action and keep the patient awake. However, gentle superficial stroking soothes the patient and is a very good agent for combating neurasthenic insomnia.

Of course, other physical therapeutic measures such as packs, Dauer baths, and drip sheets also are of great value.

(3) Alcoholism. Here the eliminative effect of massage is to be desired. First we begin with gentle effleurage, but later on all forms, including petrissage, tapotement, friction, and vibration may be used. Many alcoholics have an alcoholic neuritis and are very tender, therefore one must be very cautious if there is any nerve trunk tenderness.

(4) States of mental confusion. Cases of confusional insanity must be kept in bed and often in restraints. This enforced prolonged inactivity permits the muscles to become flabby, and the patients frequently undergo physical deterioration unless special care is taken. They may be given passive exercise and the body tone may be kept up by massage. Furthermore, these cases frequently are toxic and massage has a good eliminative effect.

(5) Hypochondria. Hypochondriac patients complain of a great variety of aches and pains together with terrific fatigue. A combination of massage and hydrotherapy frequently is useful here, and makes unnecessary the administration of large amounts of sedatives.

(6) Hysteria. Frequently hysterical patients at first object to massage because they are irritable and hypersensitive. However, by judicious handling and by persuasion on the part of the physician and the therapist, they can be gradually accustomed to physical therapy. In this condition massage has two effects. First, the suggestive effect. An hysterical individual is a highly suggestible person, and any manipulation affects him like the manipulation of a parent affects a child who suffers a minor injury. Second, there is the re-educational effect. In certain forms of hysterical paralysis, rhythmic passive motion exercises done by counts frequently produce striking results.

(7) Melancholia. This is a mental state characterized by profound emotional depression and strong suicidal impulses. These patients are beset by fears of a very distressing nature and suffer from a great variety of physical pains and discomforts all on a functional basis. One of the most frequent symptoms is a constant pain in the back of the head and neck, associated with a fear of insanity. To the average lay man, the occipitonuchal region is the "base of the brain" and any discomfort in this area is associated with a fear of insanity. The entire complex is due to excessive muscular tension, and massage is sure to give relief. At first the patients object strenuously and sometimes vociferously because they think that their condition is hopeless, and any attempt at treatment is a waste of time and money. However, if the therapist is patient and tactful, does not talk too much, and uses the proper psychology, the patient may gradually be won over and learn to look forward to the interlude.

(8) Senility. In this condition massage must be employed very carefully and judiciously because of the general enfeeblement of the patient. It is best to begin gradually and gently, and should any unpleasant sensations such as faintness, dizziness or restlessness follow, massage must be discontinued. However, if the patient can tolerate it, massage is very beneficial to elderly people because it furnishes them with passive exercise without putting a strain on the heart and blood vessels. The late Doctor Riggs frequently said that a good massage was equivalent to five miles' walk.

(9) Obesity. The first thing to be remembered in connection with this condition is the fact that fat cannot be rubbed away. All too frequently the unsuspecting public is hoodwinked by unethical charlatans into believing that by massage alone they can be caused to lose weight. Reduction in weight is merely a matter of arthmetric. If the intake of energy exceeds its consumption by the body, overweight is certain to ensue. On the other hand, if the energy output exceeds the intake, loss in weight will occur. Hence, it can be seen that unless active exercise is prescribed, or unless the diet is restricted, loss in weight cannot take place. However, in soft, flabby, tired patients with sluggish circulation, massage is of great benefit but merely as an adjunct. The best forms are kneading and tapotement.

Obviously, it has been impossible to describe all of the neurologic and psychiatric disorders in which massage is indicated and useful. Neither has it been possible to go into all of the various techniques of massage. The purpose of this communication has been merely to outline some of the commoner neuropsychiatric conditions in which the physical therapist can be of great usefulness.

The
Physiotherapy Review

Editor-in-Chief: MILDRED ELSON

Business Manager: HAZEL PUTMAN

Associate Editors

GERTRUDE BEARD

JESSIE STEVENSON

KATHERINE KING

The Physiotherapy Review is published bi-monthly by The American Physiotherapy Association

Editorial and Business Office,
303 E. Chicago Ave., Chicago

VOL. 18 January-February No. 1

Code of Ethics

As an organization, we can consider our standard of ethics the highest attainable, but as individual members, what are we doing to keep it so? We are all important. If our personal code of ethics fails, we may be assured our professional code will also fail. Let us check up on ourselves. Are we treading the heights, or are we slipping a little?

It does not matter whether we have reached our training in physical therapy through the nursing or the physical education field, for, once having fulfilled the requirements for membership, all members are of equal value to the association. We all start at "par" and from there our paths naturally deviate; some specialize in one branch of the work, and some in other branches. Bear in mind that no specialty in itself is of greater importance than another. The physical therapist who is "wise and full of knowledge," but lacks heart and interest in her work will not get the best results with her patients or the personal satisfaction of a task well done. If you are not wholeheartedly interested in your work, find something more suitable. Let your work speak for you.

What is your attitude toward your patient and the doctor with whom you work?

If you are working in a hospital clinic, do you feel "superior" to your patient? Check this attitude. Your patient is entitled to the best you have to offer. Do you take the liberty of prescribing his treatments beyond what is ethical in so far as exercises, et cetera, are concerned? If you do, stop this practice. Remember that members of the American Physiotherapy Association work only under the supervision of a physician or surgeon. Because your chief has enough faith to trust his patients with you does not mean he knows less about them. He may not know or care how much effleurage or petrissage you employ in a massage treatment, but he knows what steps he expects you to take in order to achieve the finest results. Results are what count with him. You are the means to this end.

Are you working with a physician in his private office? Avoid all criticism of him or other members of the staff. You may receive a pat on the back for remembering something which someone else has temporarily forgotten, but it will not count for much at the expense of another. In other words, be a "good fellow" to all your co-workers.

These are days when all physical therapists are living in glass houses. Keep the glass bright and clear that all who are interested may find every member of the American Physiotherapy Association a shining example of honor, service, and loyalty to a young but glorious profession.

EXECUTIVE COMMITTEE.

Seventeenth Annual Convention

The 1938 National Convention will be held in Boston, Massachusetts, June 26-30. It's time now to start making convention plans! Come back for a visit to Boston; or, if you've always meant to come sometime, but haven't, COME THIS JUNE! The Hotel Somerset will be our headquarters.

HOSTESS CHAPTER.

Changes in "Essentials of An Acceptable School for Physical Therapy Technicians"

At the November 20th meeting of the Council on Medical Education and Hospitals of the American Medical Association, certain changes in the "Essentials of an Acceptable School for Physical Therapy Technicians" were proposed and adopted. The important changes were made in the section on "Organization"—paragraphs 1, 2, 3 and 6, as follows:

1. Acceptable schools for training physical therapy technicians may be conducted by accredited universities, colleges or hospitals.

2. The Council has promulgated standards for this type of training to supply physicians, hospitals and prospective students with reliable information and for the protection of the public.

3. Responsibility for courses in hospitals should be placed on the hospital administration rather than the director of the department. In colleges and universities this responsibility is on the controlling board, as for other courses.

6. At least two or more students should be enrolled in each class.

A slight rearrangement and some rewording to clarify meaning were made in other sections but have no effect on the requirements or curriculum.

Central New York Chapter

The Central New York Chapter has held a series of lectures in electrotherapy. Professor D. T. Randall, Professor of Bio-Physics at Syracuse University, spoke on (1) nature of electrical impulse, (2) vacuum tube, (3) heat machines, (4) x-ray and ultraviolet, (5) action currents, and (6) nerve currents. These lectures were supplemented with demonstrations.

Dr. J. J. Levy, Director of Physical Therapy at the University Hospital in Syracuse, lectured on electrotherapy in physical therapy and showed the application of several machines.

Chicago Chapter

A daughter, christened Katherine Ann, was born to Mrs. Viola Schneberger Plocar this summer.

A daughter, christened Mary, was born to Mrs. Dorothy Abbs Stults this summer.

Ruth Melin, who is on sabbatical leave, is studying at the University of Michigan and hopes to get a degree in June.

Irma Walker is taking work at the University of California in Berkeley while on her sabbatical leave.

Elizabeth Mueller, who is on sabbatical leave, spent the autumn quarter taking work in physical therapy at Northwestern University Medical School. The remainder of her year is being spent on a world tour.

Mrs. Bess Searles is on sabbatical leave and is taking work at the University of Chicago.

District of Columbia Chapter

Laura Sansbury had an interesting trip in Europe last summer and visited hospitals in Stockholm en route.

Elizabeth Carlquist accompanied a patient abroad, after which she visited her home in Stockholm.

Mrs. Frieda Gassin, our president, tried her luck at Monte Carlo; then made a visit to Paris.

Ohio Chapter

Katherine Lorilliere, of the Association for Crippled and Disabled in Cleveland, sailed from New York on January 5 for Athens, Greece. She is to work there one year for the Near East Foundation. Although exact details are not known, her work will be physical therapy with children, which is an entirely new project.

Western New York Chapter

The Western New York Chapter held its winter meeting on December 4 at the Town Club in Buffalo. Dr. Herbert H. Bauckus gave an interesting lecture on "Electrotherapy and Skin Diseases."

Washington Chapter

In October 1937, Mrs. Dorothea Nylander resigned her position at the Swedish Hospital. Evangeline Courtney from Milwaukee, Wisconsin, has filled this vacancy.

Esther Robbins, who has been at the Children's Orthopedic Hospital for the past year and a half, has accepted a position at Rainbow Hospital, Cleveland, Ohio.

Elizabeth Hennessey from Boston is working at the Seattle Orthopedic and Fracture Clinic which is supervised by Marguerite Irvine.

The Washington Chapter is proud of the new physical therapy department being opened this month at the Swedish Hospital. The department occupies the first floor of a new wing recently added to the hospital and will have complete equipment for underwater treatment in addition to its present general facilities. With this new unit the hospital is taking over the care of the over-age State crippled children from the ages of fourteen to twenty-one who have formerly been cared for by the Children's Orthopedic Hospital.

One of our members, Gudrun Brask, spent an enjoyable and worth-while summer in Europe this year. She visited her father in Copenhagen, Denmark, and then took an interesting circle tour over Scotland, England, Paris, and Holland, and returned by way of Goteborg, Sweden. She also took the opportunity to study in hospitals in Copenhagen, Edinburg and London.

Charlotte Ballard of San Francisco took over Miss Brask's work for the summer. Miss Ballard was formerly secretary of the American Physiotherapy Association, and the entire Washington Chapter was happy to renew their acquaintance with her.

Index to Current Literature

ARTHRITIS AND RHEUMATISM

Treatment of Arthritis with Artificial Fever. Abst. from Am. J. M. Sc., in Jour. A. M. A., Nov. 20, 1937.

Short Wave Therapy in Articular Diseases. Abst. from Wien. med. Wchnschr., July 10, 1937, in Jour. A. M. A., Sept. 4, 1937.

Physiotherapy in Arthritis. DAVID E. JONES, M. D. Kentucky M. J., Aug. 1937.

The Spa Treatment of Arthritis. W. T. WOOTTON, M. D. South. M. J., Sept. 1937.

The Treatment of Acute Infectious Arthritis of Undetermined Origin with Artificial Fever. ROBERT M. STECHER, M. D., and WALTER M. SOLOMON, M. D. Am. J. M. Sc., Oct. 1937.

Value of Fever Therapy in the Arthritides. E. E. SIMMONS, M. D. Am. J. M. Sc., Aug. 1937.

Gonococcic Arthritis. CHESTER S. KEEFER, M. D., and WESLEY W. SPINK, M. D. Jour. A. M. A., Oct. 30, 1937.

Vaccine Therapy in Rheumatism. E. P. JORDAN, M.D. Jour. A. M. A., Oct. 30, 1937.

Bee Venom Therapy in Chronic Rheumatic Disorders. J. BARNES BURT, M. D. Brit. J. Phys. Med., Dec. 1937.

BACK CONDITIONS

The Founders' Lecture—Some Unusual Causes of Backache. H. A. T. FAIRBANK. Chartered Soc. M. & M. Gym., Nov. 1937.

Differential Diagnosis of Pain Low in the Back. ARTHUR STEINDLER, M. D. Jour. A. M. A., Jan. 8, 1938.

BONE AND JOINT

Experimental Joint Strain: Pathologic Study. LEO J. MILTNER, M. D., and C. H. HU, M. D., H. C. FANG, M. D. Arch. Surg., Aug. 1937.

DERMATOLOGY

Pyogenic Relapse and Sensitiveness to Light in Certain Dermatoses: Influence of a Factor of Intercurrent Infection. JOHN H. STOKES, M. D., and J. LAMAR CALLAWAY, M. D. Arch. Derm. & Syph., Nov. 1937.

Studies of Photosensitization by Porphyrins. HAROLD F. BLUM and NELLO PACE. Brit. J. Derm. & Syph., Nov. 1937.

Keratosis Blennorrhagia with Corneal Lesions: Further Observations on the Therapeutic Effect of Hyperpyrexia. ERVIN EPSTEIN, M. D., and STANLEY O. CHAMBERS, M. D. Arch. Derm. & Syph., Nov. 1937.

DIATHERMY

Short Waves in Chronic Sinusitis. Abst. from Arch. di Radiol., in Jour. A. M. A., Oct. 23, 1937.

The Physics of Short Waves. PHILLIPPE BAUWENS. Brit. J. Phys. Med., Nov. 1937.

Effect of Heat Applied by the Elliott Treatment and Short Wave Diathermy on Blood and Lymph Flow of Intestine and Colon (An Experimental Study in the Dog). C. R. SCHMIDT, M. S.; J. M. BEAZELL, M. D., and A. C. IVY, M. D. Arch. P. T., Nov. 1937.

Diabetes Mellitus: Short Wave Diathermy and Office Surgery. MARTYN CORNELIUS RATZAN, M. A., M. D. New York State J. Med., Oct. 1, 1937.

Short Wave Diathermy in Arteriosclerosis. Query and Minor Note, Jour. A. M. A., Nov. 27, 1937.

Modification of Tubercle Bacilli by Short Waves. Jour. A. M. A., Oct. 30, 1937.

Influence of Short Wave Treatment on Stomach. Abst. from Balneologe, in Jour. A. M. A., Sept. 18, 1937.

Short Waves: Mode of Action and Indications for Use. Abst. from Wien. med. Wchnschr., in Jour. A. M. A., Sept. 4, 1937.

Short Wave Therapy in Articular Diseases. Abst. from Wien. med. Wchnschr., in Jour. A. M. A., Sept. 4, 1937.

Cause of Complications After Short Wave Treatment. Abst. from Med. Klin., in Jour. A. M. A., Aug. 21, 1937.

Short Wave Treatment of Salpingitis and Metritis. Abst. in Brit. M. D., Oct. 16, 1937.

Diathermy in Arterial Hypertension. Abst. in Jour. A. M. A., Oct. 2, 1937, from Prensa Med. Argent.

EDUCATION

Relation of the Council on Medical Education and Hospitals to the Standardization of Schools for Physical Therapy Technicians. O. N. ANDERSEN, M. D. Arch. P. T., Dec. 1937.

ELECTROTHERAPY

Electrotherapy Papers: No. 6. Electrical Ionthophoresis. A. P. CAWADIAS, M. D. Brit. J. Phys. Med., Dec. 1937.

Electro-Medical Apparatus: Its Character, Operation and Care. No. 6. Cautery and Light Circuits and Secondary Cells. L. G. H. SARSFIELD, D. Sc. Brit. J. Phys. Med., Dec. 1937.

EXERCISE

Observations on the Response of the Pulse Rate to Exercise in Healthy Men. A. BRADFORD HILL; H. E. MAGEE, M. D., and E. MAJOR. Lancet, Aug. 21, 1937.

Exercise and Rest in Pulmonary Tuberculosis. Abst. in Jour. A. M. A., Nov. 13, 1937, from Schweiz. med. Wchnschr., Sept. 25, 1937.

EYE, EAR, NOSE AND THROAT

Short Waves in Chronic Sinusitis. Abst. from Arch. di Radiol., in Jour. A. M. A., Oct. 23, 1937.

Otitis Externa. L. GRAHAM BROWN, M. D. Brit. M. J., Oct. 9, 1937.

Treatment of Detachment of the Retina. H. ARRUGA, M. D. Arch. Ophthal., Oct. 1937.

The Diagnosis and Treatment of Tuberculosis of the Larynx. R. SCOTT STEVENSON, M. D. Practitioner, Nov. 1937.

Treatment of Ocular Tuberculosis. ALAN C. WOODS, M. D., and M. ELLIOTT RANDOLPH, M. D. Arch. Ophthal., Oct. 1937.

FRACTURES

A Modification of Braun's Splint for Use in the Treatment of Fractures of the Lower Limb. F. W. CHIA. The Chinese M. J., Nov. 1937.

Fractures: A Few Basic Principles of Treatment. ROBERT C. ROBERTSON, M. D. J. Tenn. M. A., Aug. 1937.

Fracture of the Ankle. GEORGE APFELBACH, M. D., and LEON BOIM, M. D. Arch. Surg., Aug. 1937.

GALVANISM

Electrogalvanism From Dental Fillings. Query and Minor Note, Jour. A. M. A., Aug. 14, 1937.

Second Report on the Treatment of Hay Fever, Vasomotor Rhinitis and Allergic Cases with Zinc Ionization. PHILIP L. ROMONEK, M. D. Nebraska M. J., Oct. 1937.

GYNECOLOGY

The Correct Technic in Electro-Coagulation of the Cervix, and Its Attending Dangers. (Maternal Welfare Article Number Twenty.) INGLES F. FROST, M. D. J. M. Soc. New Jersey, Oct. 1937.

Discussion on the Spa Treatment of Pelvic Disorders. (Joint Discussion No. 5.) Proc. Royal Soc. Med., Sept. 1937.

Short Wave Treatment of Salpingitis and Metritis. Abst. in Brit. M. J., Oct. 16, 1937.

HEAT AND RADIATION

Effect of Heat Applied by the Elliott Treatment and Short Wave Diathermy on Blood and Lymph Flow of Intestine and Colon (An Experimental Study in the Dog). C. R. SCHMIDT, M. S.; J. M. BEAZELL, M. S., and A. C. IVY, M. D. Arch. P. T., Nov. 1937.

Physical Aspects of Infrared Radiant Energy in Therapy. WILLIAM T. ANDERSON, JR., Ph. D. Arch. P. T., Nov. 1937.

Value of Ultraviolet Light in Industrial Districts. EVA MORTON. Brit. Jour. Phys. Med., Oct. 1937.

Further Studies in Ultraviolet Treatment of Erysipelas. MILAND E. KNAPP, M. D. Arch. P. T., Sept. 1937.

Ultraviolet Light for Air Sterilization in Ward for Infants. CHARLES B. MAJOR, M. D., and THEODORE S. WILDER, M. D. Hospitals, Nov. 1937.

Ultraviolet Spectrophotometry of Biologic Fluids. F. LOWELL DUNN, M. D., and A. T. SUDMAN, M. D. Arch. Pathol., Oct. 1937.

HYPERPYREXIA

Treatment of Gonorrhea by Hyperpyrexia in General Practice. W. H. AVERY, M. D. Canad. M. A. J., Nov. 1937.

Fever Therapy. E. E. SHEPLEY, M. D. Canad. M. A. J., Oct. 1937.

Artificial Fever Therapy of Gonorrheal Arthritis. HENRY B. GWYNN, M. D. M. Ann. Dist. of Columbia, Oct. 1937.

Treatment of Early Syphilis With Artificial Fever and Chemotherapy. Abst. from Am. J. Syphilis, Gon. and Ven. Dis., in Jour. A. M. A., Nov. 6, 1937.

Artificially Induced Fever for the Treatment of Gonococcic Infections in the Male. STAFFORD L. WARREN, M. D.; WINIFIELD W. SCOTT, M. D., and CHARLES M. CARPENTER, M. D. Jour. A. M. A., Oct. 30, 1937.

Shock in Therapeutic Hyperpyrexia. Abst. from Arch. Int. Med., in Jour. A. M. A., Nov. 27, 1937.

Treatment of Arthritis with Artificial Fever. Abst. from Am. J. M. Sc., in Jour. A. M. A., Nov. 20, 1937.

The Present Status of Artificial Fever Therapy in Medico-Military Practice. CAPTAIN E. H. PARSONS, M. C., U. S. A.; COMMANDER JOEL J. WHITE, M. C., U. S. N.; LIEUT. COL. ROBERT M. HARDAWAY, M. C., U. S. A.; SECOND LIEUT. ALICE BARNES, A. N. C., U. S. A.. Mil. Surgeon, Oct. 1937.

Treatment of Undulant Fever by Artificial Fever Therapy. Report of a Case. WALTER J. ZEITER, M. D. Cleveland Clinic Quarterly, Oct. 1937.

Fever Therapy in Children. LOUIS SPEKTER, M. D., and ANGUS MCBRYDE, M. D. J. Ped., Oct. 1937.

An Instrument for the Continuous Reading of Rectal Temperature. WILLIAM BIERMAN, M. D. Jour. A. M. A., Sept. 11, 1937.

Fever Therapy: Adaptation of the Vapor Bath, Electric Light Bath, Use of Oxygen, Carbon Dioxide from Dry Ice. PAUL ROTH, M. D. J. Mich. M. Soc., Aug. 1937.

Artificial Fever Therapy: A General Review. NORMAL N. EPSTEIN, M. D. Southwestern Med., Sept. 1937.

The Treatment of Acute Infectious Arthritis of Undetermined Origin with Artificial Fever. ROBERT M. STECHER, M. D., and WALTER M. SOLOMON, M. D. Am. J. M. Sc., Oct. 1937.

Gonococcic Septicemia with Purpura and Arthritis Successfully Treated by Hyperthermia. ONIX GEORGE HAZEL, M. D., and WILLIAM BENHAM SNOW, M. D. Jour. A. M. A., Oct. 16, 1937.

Treatment of Gonorrhea in the Female by Means of Systemic and Additional Pelvic Heating. WILLIAM BIERMAN, M. D. J. M. Soc. New Jersey, Sept. 1937.

Keratosis Blennorrhagia with Corneal Lesions: Further Observations on the Therapeutic Effect of Hyperpyrexia. ERVIN EPSTEIN, M. D., and STANLEY O. CHAMBERS, M. D. Arch. Derm. & Syph., Nov. 1937.

Artificial Fever Therapy. WALTER M. SIMPSON, M. D., and H. WORLEY KENDELL, M. D. Colo. Med., Nov. 1937.

HYDROTHERAPY

The Spa Treatment of Arthritis. W. T. WOOTTON, M. D. South. M. J., Sept. 1937.

Tidal Irrigation of the Colon to Reduce Hyperthermia: A Preliminary Report. E. J. STEENROD, M. D. Proc. Staff Meet. Mayo Clinic, Sept. 29, 1937.

Discussion on the Spa Treatment of Pelvic Disorders. (Joint Discussion No. 5) Proc. Royal Soc. Med., Sept. 1937.

INJURIES

Volkmann's Ischemia. HENRY BASCOM THOMAS, M. D., and FRED W. HARK, M. D. Radiologic Rev. and M. V. M. J., Nov. 1937.

NEUROLOGY AND PSYCHIATRY

Neuro-Psychiatric Effects of Electric Trauma. PAUL A. DRAPER, M. D. Colo. Med., Sept. 1937.

Physical Measures in Traumatic and Functional Neuroses. NATHAN H. POLMER, M. D. Arch. P. T., Nov. 1937.

Physical Exercise Therapy: In Mental Hospitals. DUNCAN D. CAMPBELL, M. D., and JOHN EISELE DAVIS, M. A. Hosp. Management, Aug. 1937.

Present Day Status of the Treatment of Neurosyphilis. PAUL A. O'LEARY, M. D. Jour A. M. A., Oct. 9, 1937.

PEDIATRICS

Fever Therapy in Children. LOUIS SPEKTER, M. D., and ANGUS MCBRYDE, M. D. J. Ped., Oct. 1937.

PERIPHERAL VASCULAR DISEASES

Peripheral Vascular Diseases. GEORGE W. SCUPHAM, M. D., and Geza de Takats, M. D. Arch. Int. Med., Sept. 1937.

PNEUMONIA

Physiotherapy in the Treatment of Pneumonia. J. WALTER TORBETT, JR., M. D. Texas State J. Med., Oct. 1937.

The Treatment of Pneumonia. W. S. KERLIN, M. D. Tri-State M. J., Oct. 1937.

POLIOMYELITIS

The Prevention of Disability in Poliomyelitis. H. L. GREENE, M. D. Wisc. M. J., Nov. 1937.

POSTURE

Effects of Posture on Blood Pressure. Abst. from Am. Heart J., in Jour. A. M. A., Oct. 30, 1937.

SPASTIC PARALYSIS

The Spastic Child. FRANK H. EWERHARDT, M. D. Arch. P. T., Nov. 1937.

STATE PLANS

Wisconsin's Dual Program for the Crippled Child. FLORENCE L. PHENIX. Public Health Nursing, Nov. 1937.

TUBERCULOSIS

Bilateral Tuberculous Dacryadenitis. HENNING SKYDSGAARD. Acta Ophthalmologica, Vol. 15, Fasc. 1, 1937.

Present Status of Laryngeal Tuberculosis: A Review of 245 Cases. DAVID I. FRANK, M. D., and GEORGE D. WOLF, M. D. N. Y. State J. Med., Oct. 1, 1937.

Exercise and Rest in Pulmonary Tuberculosis. Abst. in Jour. A. M. A., Nov. 13, 1937, from Schweiz. med. Wchnschr.

Laryngeal Tuberculosis. TH. RUEDI. J. Laryng. & Otol., Aug. 1937.

The Diagnosis and Treatment of Tuberculosis of the Larynx. R. SCOTT STEVENSON, M. D. Practitioner, Nov. 1937.

Treatment of Ocular Tuberculosis. ALAN C. WOODS, M. D., and M. ELLIOTT RANDOLPH, M. D. Arch. Ophthal., Oct. 1937.

MISCELLANEOUS

The History of Physical Medicine. SIR HUMPHRY ROLLESTON. Brit. J. Phys. Med., Nov. 1937.

Experiments with Decimeter Wave Therapy. MARTHA BRUNNER-ORNSTEIN, M. D. Arch. P. T., Nov. 1937.

Physiological Reactions of the Human Body to Varying Environmental Temperatures. C. E. A. WINSLOW, L. P. HERRINGTON and A. P. GAGGE. Am. J. Physiol., Sept. 1, 1937.

Physiological Reactions of the Human Body to Various Atmospheric Humidities. C. E. A. WINSLOW, L. P. HERRINGTON and A. P. GAGGE. Am. J. Physiol., Oct. 1, 1937.

Sympathectomy in Man: Its Effect on the Electrical Resistance of the Skin. CURT P. RICHTER, PH. D., and MAURICE LEVINE, M. D. Arch. Neurol. and Psych., Oct. 1937.

Occupational Therapy in Leprosy. A. A. STEIN, M. D. Urol. & Cutan. Rev., Sept. 1937.

Hay Fever: The Diagnosis and Treatment. A. N. HARDY. Canad. M. A. J., Aug. 1937.

The Treatment of Sciatic Pain. ROY M. HOOVER, M. D. Virginia M. Mo., Oct. 1937.

High Frequency Transmission of Stimulating Impulses. HENRY NEWMAN, M. D., FREDERICK FENDER, M. D., and WILLIAM SAUNDERS, E. E. Surgery, Sept. 1937.

Pigmented Basal-Cell Epithelioma. Abst. from Ann. de Dermat. et Syph., in Jour. A. M. A., Aug. 7, 1937.

Rickets Resistant to Vitamin D Therapy. FULLER ALBRIGHT, M. D., ALLAN M. BUTLER, M. D., and ESTHER BLOOMBERG, B. S. Am. J. Dis. Child., Sept. 1937.

ABSTRACTS

John S. Coulter, M. D.

Physiologic and Clinical Effects of Short Wave Diathermy

John S. Coulter, M. D., and S. L. Osborne, B. P. E., J. Med. 18:6:283 (August) 1937.

At Northwestern Medical School we have made over three hundred tissue temperature measurements mostly on human subjects but some on animals. From this data it would appear that in the heating of live human muscle and fat there were no significant differences in the use of different wave lengths.

Short wave diathermy may be administered by the high frequency electric field or by electromagnetic induction. We have found the electromagnetic induction (coil technic) to be the most effective and convenient method of producing heat in the depths of living human tissues.

Electromagnetic Induction Technique.—In this method of administering short wave medical diathermy the current is conducted to the patient by means of a very flexible heavily insulated cable or by means of a disc electrode containing the cable coiled and positioned ready for treatment. The cable is coiled about or around the part to be treated when the cable is used as the electrode. Surrounding the coil, through which the high frequency current flows, there is set up an alternating magnetic field having the same frequency of alteration as the current in the coil. Any electrically conductive material placed within the electromagnetic field will have induced in it a voltage causing "eddy currents" of electricity to flow, the frequency of which will be the same as that flowing in the coil (approximately fifteen million cycles). If living tissue is placed within the electromagnetic field of this apparatus, the effect of the eddy currents induced in the tissue will be the production of heat, and there will be absolutely no neuromuscular response since the frequency of the eddy currents is far above that which elicits muscular contraction. If a body composed of materials of different electrical conductivity, such as human tissue, is placed within the coil, the intensity of the heating developed in the various constituent materials will vary with their conductivity, the maximum intensity of eddy currents and heating being in the tissues of greatest conductivity. Close proximity, therefore, of any metallic or other conductive articles should be avoided when treatment is in progress so that the patient may receive the full effect. It is also usually necessary to provide a good ground for these machines. The manufacturers of the particular apparatus used will designate whether a ground is necessary or not. A good ground can usually be secured by connecting the ground wire under the metal screw holding the metal wall plate in place, or by connecting the ground wire to a cold water pipe by means of a metal clip. This latter method will always insure a good ground. It is not advisable to use metal treatment tables. Mattresses with inner springs should never be used as sufficient heat under certain conditions may be generated in the springs to ignite the mattress material. An iron bed can be used provided the coil is kept at least a foot away from any portion of the iron frame work. A wooden chair is satisfactory where it is desired to give treatments in a sitting position. The section of the cable between the plug-in terminals of the machine should be separated at least four inches. This is necessary because the capacity between these leads, if brought close together, will serve as a shunt for the very high frequency current and will bypass the part being treated, thus reducing the efficiency of the current. Energy thus shunted will unduly heat the insulation of the cable. For a similar reason, it is not advisable to treat a patient resting on an object which is grounded. If this is done, current will be passed into the patient by conduction through the capacitive coupling between his body and the cable. Failure of the circuit to oscillate may result from "too close coupling" between the electrode cable and the patient. This may happen when the electrode cable is positioned too close

to the patient or when there are too many turns or loops in it for a given distance between cable and patient.

Electric Field Technique.—The technics accepted by the Council on Physical Therapy of the American Medical Association for the use of the electric field are the double cuff technic and the air spaced electrodes so applied that one electrode is proximal and one distal and both on the same surface as the part to be treated.

The cuff electrodes are made of flexible metal plates vulcanized between two layers of rubber providing thorough electrical insulation, so that there will be no danger of the current arcing from the metal to the patient's skin. These vary in size according to the characteristics of the various machines. Sufficient bath toweling or felt must be interposed between the electrodes and the skin. If too much padding is used there will be too little internal heating and if insufficient is used the superficial tissues will become too hot and burning is very apt to occur. Most manufacturers therefore supply the proper thickness of felt to be used for their particular machine. The electrodes should never be applied over clothing of any kind. One must guard against the accumulation of pools of moisture, as perspiration between the patient and electrode will cause prickling, hot spots and, if not corrected, blisters. Never disregard the patient's complaint regarding hot spots.

The use of pad electrodes is the most *inefficient* technic for the deep heating of tissues with short wave diathermy. It is to be emphasized that the Council on Physical Therapy have not accepted this mode of application.

Air Spaced Electrode Technique.—In applying the air spaced electrodes, the dosage, as with other methods, is regulated by the patient's tolerance. The ability to heat the deep tissues of the human thigh with air spaced electrodes appears to be dependent on the size of the electrodes, the energy available from the apparatus, the method of application, the distance of electrodes from the skin, and the patient's tolerance.

The Council on Physical Therapy of the American Medical Association has accepted these electrodes as an efficient method of producing heat in the deep tissues when properly applied on the same surface of the part to be treated. Other techniques in which the part to be treated is sandwiched between the electrodes are of no value unless superficial heat is desired. To be effective, both electrodes must be on the same plane of the area to be treated.

We believe that the therapeutic results of medical diathermy can be attributed to the effects of heat. Therefore it would seem unnecessary to enumerate the many conditions for which medical diathermy can be used. We reiterate, however, that we have found electromagnetic induction to be the most effective method of producing heat in human tissues when using high frequency current. The contraindications are those usual to conventional medical diathermy.

Research workers at Northwestern University Medical School investigating the clinical results of artificially induced fever use the electromagnetic induction method exclusively because it is believed to be the safest and most comfortable for the patient. This group of men have investigated the value of fever in such conditions as infectious arthritis, gonorrheal arthritis, general paresis, chorea minor, intractable asthma, multiple sclerosis, as well as syphilitic complications.

Infantile Cerebral Palsy; Its Treatment by Selective Inhibition of Sensory Stimuli

Earl R. Carlson, M. D., New York, New York. Ann. Int. Med. 11:2:324, (August) 1937.

The treatment of infantile cerebral palsy in contrast to that of anterior poliomyelitis requires that more attention and thought be given to the sensory side of the reflex arc. In this paper an attempt has been made to show the influence that selective inhibition of sensory stimuli has on the patient's ability to control his muscles. During sleep the adventitious muscular movements cease. The effects of ether, alcohol and sedatives were mentioned. The effects of reducing or concentrating visual stimuli in talking, walking and use of hands were noted. The effect of selective inhibition of sensory stimuli by developing interests in piano, golf, chemistry and bacteriology was pointed out.

In conclusion it may be said that those natural or environmental stimuli which affect the normal individual also affect the cerebral palsy. Indeed it is indisputable that the cerebral cortex receives these stimuli, visual, auditory, proprioceptive sense, etc., summates these stimuli and transfers them to their proper channels for their final release through motor or other pathways. In the cerebral

palsies where there is considerable damage to the cerebral cortex and the ideational centers are preserved, these stimuli affect the injured brain in a manner shown in the individual cases. A shunting of one or more sensory stimuli will affect the cortex in degrees and thus the final release will be somewhat more towards the normal; as, for example, the spastic athetoid cases mentioned who have great difficulty in doing simple acts,—like feeding themselves,—and yet are able to do skilled acts satisfactorily,—like playing golf, playing the piano, and working out laboratory problems in chemistry and bacteriology. With educational training new channels of release will be provided, a partial inhibition of sensory stimuli will be accomplished, and in due time a summation of these sensory stimuli will result in more or less the normal manner.

The Treatment of Spinal Cord Injuries

Loyal Davis, M. D., Chicago, Illinois M. J., 72:3:240, (September) 1937.

After-Care.—The aim of treatment of spinal cord injuries should be to restore the patient to an economic and social independence. It is a common error to look upon the disabilities which result from these injuries as hopeless. Many of the crippling deformities and contractures which are observed commonly after injury to the spinal cord can be entirely avoided or to a great extent improved.

Gentle massage of the muscles, the use of radiant heat, and the whirlpool bath are all agents which have proven helpful. Passive movements may be carried out very well in conjunction with massage. They help to stretch contractures which have already occurred and to prevent those which invariably occur in an inactive or denervated muscle. They also increase the range of motion in an already stiffened joint and help to keep a mobile joint active so that when the time comes it is ready to perform its part as an effector mechanism. Such movements help to re-educate the muscles in performing normal movements. These exercises should be carried out slowly, gently, and never with quick, jerky movements.

The use of electrotherapy in spastic paraplegic patients accomplishes very little as compared to the results which may be obtained in the flaccid paralyses. Electrotherapy is indicated to prevent the atrophy of muscles and fibrosis, to increase nutrition and to conserve the functional capacity of paralyzed muscles until sufficient return of function has taken place to permit of active motion.

Much can be done by the intelligent use of splints in cases of flaccid paraplegia. While the patient is in bed, foot drop may be avoided by the use of sandbags against the soles of the patient's feet and a cradle over the legs to keep the weight of the bed clothes off the feet. These require careful and constant adjustments, and it may prove more desirable to use light crinoline posterior molded splints which may be removed easily for massage and passive movements.

Exercises and Muscle Re-education.—Very often the paraplegic patient is looked upon by his physician as hopeless. Many times massage, active and passive movements, electrotherapy and splinting may be carried out quite effectively until the patient is ambulatory. It is necessary to teach him to use his recovering muscles to his best advantage. He must be taught to walk again. While one may feel that this will be accomplished gradually in spite of what may be done, there is no question but that progress has been more rapid as the result of directed muscle exercises and re-education.

One of the simplest devices to teach the patient to use his extremities may be made of small iron pipes and is similar to a baby's "walker." The patient stands within this frame, which is on rollers, and rests his weight upon his arms, which grasp its sides. Another excellent method of re-education in walking is to have the patient walk in an aisle bounded by iron pipes, which may be grasped easily, and upon which he may rest his weight as he progresses. The floor of this aisle consists of a board upon which are painted numbered square spaces, varying in size. The patient attempts to place his feet within these spaces and as he progresses the wider spaces are utilized. The results of this method may be increased by having the patient observe the movements of his legs in a mirror.

It has also been found that the movements of the lower extremities may be performed more easily in slightly warmed water. This is true of the spastic as well as the flaccid paralyses. A Hubbard tank is an excellent means of carrying out these under-water movements. This may be installed in the basement of the home at relatively little expense and is extremely valuable.

The few examples given of methods of re-education of the muscles of the lower extremities can be multiplied many times. In more

advanced cases a stationary bicycle may be used or a rowing-machine employed to advantage. Just as in the re-education of the upper extremities, educative exercises which are productive intrigue the patient and secure his whole-hearted cooperation.

Orthopaedic Surgery in the Treatment of Rheumatism and Rheumatoid Arthritis

Gordon O. Tippett, F. R. C. S., Chief Assistant, Orthopaedic Department, Croydon General Hospital; Assistant, Orthopaedic Department, St. John Clinic of Physical Medicine, and the Arthritis Unit of the London County Council; in the Practitioner, CXXXIX:3:271, September 1937.

The Prevention of Deformities

Splinting.—During the acute stages of the disease, the joints must be kept at rest with some form of splintage. Either a plaster cast or malleable splint should be supplied. To the joints themselves applications of lead, belladonna, or iodex relieve the pain. Heat in the form of antiphlogistine or infra-red radiation may be given. Once a day the limb should be taken out of the splint and an endeavor made to put it through some of its range of movement.

The Correction of Deformities

Considerations. — The following points should be considered before the surgeon begins:

(a) He must assure himself that the acute stage has passed as shown by the absence of temperature and a nearly normal sedimentation rate, and that the joints are no longer hot and swollen.

(b) X-ray pictures must be taken of the joints concerned.

(c) That as the most painful joints are those with a limited range of movement, it will be worth a trial to see if the deformity can be corrected by splintage and physical therapy. If on the other hand, there is no movement, correction by some form of operation must be undertaken.

Correction by Physical Therapy.—This is carried out on a joint which though deformed still has a little movement, and aims at correcting the deformity and restoring movement. The deformity is corrected by the application of some form of hinged splint or successive applications of plaster of Paris, each application producing a little more correction. If the method of splintage is adopted, a masseuse should apply some form of heat daily to the joint. The joint should be taken out of the splint, massage given, and further stretching done. As the deformity is being corrected, the encouragement of movement is undertaken.

Correction by Operation.—This is undertaken on a stiff joint which is too painful to permit of correction by stretching.

The Restoration of Movements

Provided that the active disease is over, it should be possible, if appropriate treatment be undertaken, to secure a working range of movement to most of the joints which were affected during the acute stage. It is impossible to forecast the degree of recovery of any joint, although it stands to reason that a joint which was not badly affected will recover best. An x-ray picture will not help in forecasting this restoration of movement and is, as is so often the case in osteoarthritis, very misleading. Often such a joint with much change as shown on the x-ray film will have a surprising range of movement. The restoration of movement will take many months, and the surgeon often will have to be content with a limited range of painless movement.

Methods Employed.—The restoration of movement in a joint which has had a deformity should not be started upon until about half of the normal position of the joint has been secured. For treatment purposes the joint will be taken off the splint. Each day the joint is given a dose of heat, either in the form of radiant heat, infra-red or diathermy. The muscle wasting, which is a prominent feature, is treated by massage and surging faradic current. This is given with a Bristow coil. Active movements are undertaken, gentle at first; these will help the recovery of muscle power. Later the masseuse moves the joint, putting it through the range of free movement several times, although more important than this passive movement is the active movement that the patient carries out. It should be the aim of the masseuse to make the patient's own muscles, by their contraction, increase the range of movement. Forced movements by her may do more harm than good. Tearing of tissues which are still stuck together by brute force only causes further hemorrhage and fibrous tissue formation. It will thus defeat its own end.

When the joints have recovered a fair range of movement, the splints gradually may be left off during the day but retained at night

splints. At this stage the patient after his treatment is encouraged to use his joint, doing certain specified movements so many times after each meal. Thus he continues his own restoration.

Manipulation.—Manipulation is the forcing of a stiff joint under anesthesia. The technique of manipulation can be learned only by watching it done and by practice. Points to be stressed are these: Repeated manipulations on a stiff joint are better than the use of too much force at any one time. The reaction of the joint is likely to be severe if the adhesions are broken down too extensively, and, as stated before, further fibrous tissue formation will ensue causing only worse stiffening. The hands of the manipulator should in most cases take only a short leverage on the bones. In rheumatoid arthritis there may be much decalcification, and the bones will be very brittle. Distraction should be made on the joint as well as leverage; rotation as well as flexion and extension should be carried out. Tender spots suggest adhesions; if digital pressure be made over them and rotation movements carried out, they often can be heard to give way with a crunch or snap.

The "Regimented Rationale" in the Treatment of Rheumatic Disease

William K. Ishmael, M. D., and Earl D. McBride, M. D., F. A. C. S., Oklahoma City, J. Oklahoma M. A., 30:10:351, (October) 1937.

When such a comprehensive regime of management has replaced the poorly planned, haphazard symptom relieving methods of temporary effectiveness and the rheumatic patient as well as the general public is taught the reality of procrastination in seeking competent diagnosis and is awakened to the fickleness of trying out undirected cures then will there be a realization that the chronic arthritic can exert a normal span of life within his limits of disability just as the patient with tuberculosis or diabetes has found he can do. It seems appropriate to designate such a system of treatment the "Regimented Rationale."

Outline of Regimented Rationale

In outline, the "regimented rationale" would be somewhat as follows:

1. Recognition on the part of the physician that the disease must be classified and treated according to etiological diagnosis.
2. A detailed systematic investigation of each particular case, using all facilities of clinical and laboratory procedures available.
3. Consultation with specialists, such as dentistry, otolaryngology, proctology and others.
4. Thorough correlation and management of the case through cooperation between the one who actively manages the case and those who have brought about the information as the result of clinical and laboratory research.
5. Details of treatment:
   a. Medical relief of pain and immediate symptoms.
   b. Correction of constitutional disturbances:
      (1) Metabolic disturbances.
      (2) Endocrine influences.
      (3) Vitamine deficiencies.
      (4) Gall bladder, intestinal and other systemic factors.
      (5) Allergy phenomena.
   c. Removal of focal infections.
   d. Specific therapy; vaccines.
   e. Orthopedic measures.
   f. Physical therapy.
   g. Drugs.

Such a program is successful provided it is carried out thoroughly, but any partial application is bound to fail.

Physical Therapy

Physical therapy affords, as a whole, the oldest means of attack on the rheumatic problem. The use of physical therapy is far from being appreciated and up until relatively recent times has been in the hands of masseurs and various cults. The popularity of the various resorts and springs tells us that we are overlooking an important phase in medicine.

The influence and use of heat together with massage and medical gymnastics form the most valuable measure in the realm of physical therapy in relation to arthritis. Such treatment should be given by a competent physical therapy technician under the direct supervision of the physician who is managing the case.

Fever therapy is one special method of heat therapy that has proved to be a specific in gonorrheal arthritis. A temperature of from 104° F. to 106° F. is maintained for three hours or so, and from two to four treatments are necessary.

Massage, hydrotherapy, colonic irrigations, exercises and various high frequency currents may have very definite contra-indications. Too many patients with lowered blood pressure,

impaired heart action and general debility are subjected to weakening, severe hot baths without medical supervision. Many acute joints are made worse by the indiscriminate use of infra-red and various short wave treatments.

Special mention should be made of the administration of acetyl choline derivatives by iontophoresis or galvanism. Again medical supervision is essential to prevent accidents from lowered blood pressure. Very encouraging results can be had in chronic cases.

The therapeutic value of physical therapy can be summed up by listing the definite responses:

1. Prevention of atrophy, correction of deformity, and restoration of a better muscle tone.
2. Improvement of local and general circulation and metabolism.
3. Prevention of ankylosis and restoration of joint motion.

Postural Defects Related to Arthritis

Edward F. Hartung, M. D., New York. Arch. Phys. Therapy, 18:10:626 (October) 1937.

Defects in bodily posture affect patients with arthritis in five ways: (1) Poor posture is a mechanically inefficient carriage and therefore requires an undue amount of energy in standing and sitting. In this way it adds one more burden to the already overburdened constitutional inadequacy of these patients. (2) It produces ptosis of the gastro-intestinal tract and decreases the vital capacity of the lungs. This embarrasses the normal function of these organs. (3) It predisposes to lower back pains. (4) It causes undue trauma at certain joints, predisposing these to the localization of arthritis. In osteoarthritis, where the process is generalized, this static trauma localizes the development of pain in certain crucial areas, such as in the lumbo-sacral and cervical spine, the knees and the feet. (5) It has a depressing psychologic effect.

In correcting posture the first question to decide is our concept of normal posture. Good posture certainly is not average posture because at least 70 per cent of healthy young adults deviate from the accepted ideal. It is better to discard the expression "normal posture" and confine ourselves to the terms "good posture" and "bad posture" in varying degrees. This greatly simplifies the problem, for we are then dealing merely with the question as to whether the particular posture under consideration is mechanically efficient.

Enumeration of the details of the methods by which postural defects are corrected would require a great deal of space. There are two points which should be emphasized. Muscular exercise in itself unless properly planned will not correct postural defects. Many people with a well developed musculature have poor posture from the mechanical point of view. Chamberlain, for example, observed an athlete who trained himself until he could sit up from the reclining position 300 times in succession without resting, and yet Chamberlain failed to find any upward move of the greater curvature of the stomach resulting from this abdominal muscle development.

The second point is that the keystone of defective posture often is a lumbar lordosis and the associated pelvic tilt. Instruction to the patient to hold his head up, throw his shoulders back or "suck in his belly" will not touch the fundamental problem. To correct lumbar lordosis, emphasis is placed not on exercises alone but on developing a conscious control especially of the gluteal and abdominal muscles. This localized control enables the individual to hold the pelvis in its normal position. Without gaining this neuro-muscular control no amount of exercise will bring about satisfactory improvement in posture.

Tuberculosis of the Cervical Lymphatic Glands

R. Reid, M. S. Lond., F. R. C. S., Consulting Surgeon; and M. C. Wilkinson, M. B. Lond., Medical Superintendent, Essex County Council Sanatorium, Black Notley; in British M. J., Oct. 16, 1937, page 740.

Tuberculosis of the lymphatic glands is a disease that tends to run a long and debilitating course but shows also a disposition to undergo natural cure when the patient's resistance can be assisted by his circumstances and environment.

This review deals with 119 consecutive cases of tuberculous cervical adenitis treated in Black Notley Sanatorium (Essex County Council) over a period of six years.

Details of Treatment

Tuberculous lymphadenitis may be regarded as a local tuberculous lesion in a patient whose resistance to the disease is insufficient. Constitutional treatment, therefore, is of paramount importance to prevent progress or recrudescence of the disease. The chief factors in constitutional treatment are rest, open air,

a liberal balanced diet with adequate vitamin supply, and heliotherapy.

With regard to rest, the patient should be restrained from all activity, but in our experience rest in bed for the whole day is not necessary unless the disease is very active. Fixation of the head and neck in sandbags or plaster has been used only rarely in this series. Sunlight and artificial ultraviolet light treatments have been found to be of value; general applications have been used to improve the patient's resistance to tuberculosis and local applications to aid in healing ulcers following the breaking down of tuberculous glands.

Reference has been made to the importance of tonsillar and pharyngeal sepsis in the pathology of tuberculous glands of the neck. The practice in cases showing signs of tonsillar disease has therefore been to perform tonsillectomy as soon as the patient is acclimatized and the general condition is sufficiently good to render the operation a matter of incident only. Following this treatment there is improvement in the general condition of the patient and in the rate of subsidence of the glands.

The treatment of a tuberculous abscess arising from a gland depends on whether superadded secondary infection has occurred or not. If there is secondary infection, the pus should be evacuated by incision and free drainage should be established. If there is no secondary infection an attempt should be made to treat the abscess by aspiration.

Conclusion

In our opinion the opinions below summarize our experience of tuberculous glands of the neck derived from the collection and study of the cases forming this series.

The nasopharyngeal lymphatic tissue is the probable path of entry for the tubercle bacillus in this disease.

Tuberculosis of the cervical lymph glands is a local disease which does not give rise to metastatic lesions.

Treatment is basically by constitutional methods aided at the proper time by active surgical procedures.

When treatment is carried out according to the above plan, results are satisfactory.

Coccygodynia and Pain in the Superior Gluteal Region and Down the Back of the Thigh

Causation by Tonic Spasm of the Levator Ani, Coccygeus and Piriformis Muscles and Relief by Massage of These Muscles.

George H. Thiele, M. D., Kansas City, Mo. J. A. M. A. 109:16:1271 (Oct. 16) 1937.

Technic of Massage

Ely in 1910 reported on the treatment of coccygodynia by massaging the coccyx and its immediate soft parts between the thumb and forefinger and stated that "usually two or three treatments at intervals of two or three days will suffice to cure." He did not mention muscle spasm nor did he describe massage of the levator ani or coccygeus muscles.

A uniform technic of massage has been used in all cases. With full length insertion of the finger in the rectum, latero-posterior pressure will place its flexor surface horizontally across the surfaces of the levator ani and coccygeus muscles almost at a right angle to their fibers. The fibers of the piriformis are felt immediately beyond the sacrospinous ligament and are touched by the finger tip in such a manner that lateral motion of the finger will stroke lengthwise that portion of the belly of the muscle lying within the pelvis.

These muscles are massaged in the long direction of their fibers in the same manner that a strop is stroked by a razor. Massage is begun lightly. This is necessary because one does not wish to traumatize the extremely tender spastic muscles. The sacrospinous ligament is merely pressed on by the finger in a direction vertical to its long axis. As the patient makes subsequent visits, massage is made with increasing pressure. If a reaction evidenced by increased pain is evoked, light massage is again reverted to and pressure is increased as tenderness decreases.

If definite improvement does not result after the first four to six massages over a period of a week or ten days, orthopedic or other indicated consultation should be sought.

Passive Vascular Exercise in Diabetes

Abstract from Kentucky M. J., 35:326 (July) 1937. In J. A. M. A. 109:11:907 (Sept. 11) 1937.

Edelen calls attention to the harmful effect of heat in the form of hot water bottles, hot packs, electric pads or cradles with electric lights. Accompanying the impaired circulation there is an impaired sensory mechanism and before one realizes it irreparable harm has been done to a toe or foot, with the formation of blebs or blisters. Heat also increases the metabolism of tissues in an extremity in which there is already a deficient circulation, and this leads to harmful results.

It is in this instance that the use of passive vascular exercise is valuable, for with increase in cellular metabolism caused by heat, passive vascular exercise therapy will bring about the needed increase in blood supply. The use of heat in combination with the exercise overcomes vasospasm. It is a vital aid in developing collaterals, hastens the demarcation of spreading gangrene and is quite a factor in converting moist gangrene to dry gangrene. The best results from passive vascular exercises are obtained in patients with involvement of major arterial pathways, and the least benefit is obtained in persons with extensive sclerosis of the arterioles of the feet and toes. In diabetic patients the so-called arteriolar bed is fairly good, and passive vascular exercise is valuable in restoring a circulatory balance. This mechanical means of reducing environmental pressure will not obviate surgical intervention but it will tend to more conservative surgical procedures, aid in demarcation of gangrene and promote healing.

Physical Therapy of Chronic Atrophic Arthritis

Euclid M. Smith, M. D., Hot Springs National Park, Arkansas, Department of Medicine, University of Arkansas School of Medicine, Little Rock, Arkansas. Arch. Phys. Therapy, 18:10:622, (October) 1937.

Hot Baths

By immersing the body in hot water, an even bodily temperature can be obtained which can be lowered or raised to secure the effect desired. The bath is started at a temperature of between 96 and 98, gradually increased to 99 to 100 degrees F., or even more if desired. While the patient is placed in the tub, general friction with a rough mat is instituted by the attendant. The time of the bath depends on individual tolerance, and usually lasts from 20 to 30 minutes. Upon removal from the tub the patient is placed in a vapor cabinet for 3 to 10 minutes, after which he enters a pack room at a temperature of 115 degrees F. Here hot packs are applied to the affected joints. These packs are changed two or three times in a period of 15 to 30 minutes. The patient then goes from the pack room to the cooling room, where he is gradually cooled and given a tepid shower, followed by very light massage and an alcohol rub. Baths should be taken on an empty stomach, the bowels should be kept working properly, and at least one-half gallon of water should be taken in a 24-hour period. In our work we have found cold mineral water a valuable adjunct to the treatment, as the mineral properties of the water aid in maintaining the alkaline balance of the body. Then, too, larger quantities than of any other water can be tolerated.

Therapeutic Exercise

The program of exercise is directed toward the prevention and correction of deformity, the reeducation of atrophied muscle groups and the restoration of normal body mechanics. The type of exercise depends entirely upon the needs of the individual patient. A routine set of exercises can be fitted to group needs. The administration of the exercises in a pool of hot water greatly increases their effectiveness, and the buoyancy of the water permits certain mechanical advantages which enhance the efficiency of the exercises.

Underwater Massage

The effectiveness of underwater exercise is further enhanced by underwater massage and by stretching of contracted muscles and ligaments. Light stroking is started as soon as a hyperemia is attained. This stroking is confined to the muscle group above and below the affected joint, and after a relaxation is obtained, heavier reverse stroking is started on the contracted groups. Gentle traction is then begun and gradually increased to the point of pain. Stretching is done very slowly but firmly, many contractures being overcome that would otherwise require operative intervention.

Artificial Fever Therapy of Sydenham's Chorea

H. Worley Kendell, M. D., and Walter M. Simpson, M. D., Dayton, Ohio, in Ohio State M. J., 33:10:1097 (October) 1937.

Summary and Conclusions

Controlled, adequate artificial fever therapy provides a new and promising method for the treatment of Sydenham's chorea.

The common factor in those methods of treatment which have proved effective in overcoming the symptoms of Sydenham's chorea, such as typhoid-paratyphoid vaccine and nirvanol, has been the production of fever.

Artificial fever induced by physical methods has the advantage of providing a means by which the height and duration of fever can be controlled. Furthermore, the untoward

reactions which often accompany foreign protein shock therapy can be avoided.

Of five children with Sydenham's chorea who were treated with artificial fever at the Miami Valley Hospital, utilizing the Kettering hypertherm, three presented evidence of rheumatic carditis. The choreic symptoms and signs disappeared promptly and have not recurred during observation periods of six weeks to four and one-half years. The evidence of rheumatic carditis disappeared in the three patients exhibiting the complication.

The presence of rheumatic carditis does not appear to be a contraindication to artificial fever therapy. There is evidence that complications such as rheumatic carditis and arthritis are often benefited.

The growth of interest in the new form of therapy is manifested by the many favorable reports appearing in medical literature during the past few years.

Artificial fever therapy seems worthy of more extensive use in the management of Sydenham's chorea. This form of treatment should be carried out only in adequately equipped hospitals by thoroughly trained, devoted physicians and nurse technicians. Artificial fever therapy is not adapted to use in the office or home.

Treatment of Atrophic Arthritis

B. M. Overholt, A. B., M. D., and M. A. Mortensen, M. D., F. A. C. P., Battle Creek, Michigan, Jour. M. S. M. S., 36:9:640 (September) 1937.

The treatment of the arthritic eventually resolves itself into the management of the patient from many different viewpoints. That the situation has been somewhat clarified can be attributed to two factors:

1. The recognition that there are two great classes of chronic non-specific arthritis, atrophic (rheumatoid) and hypertrophic (osteoarthritis).

2. The recognition that "atrophic arthritis is a systemic malady and must be treated as such."

The value of complete rest in bed at the beginning of treatment cannot be too strongly emphasized. There seems to be an unwarranted fear of putting the patient with atrophic arthritis to bed and it is often difficult to obtain the coöperation of the patient in this respect because of the fixed opinion in the minds of the laity that they should be kept moving. This phase of the treatment occupies a most important part of our regime and should be undertaken with the object of giving the patient complete mental and physical rest and should be carried out preferably away from home where the aggravating circumstances of everyday environment will be eliminated. It has been our experience that after such a period of rest the nervous instability which these patients often exhibit is much less, inflammation and soreness of joints will have subsided to a large extent and where there has been an elevation of temperature it often will have become normal. The exact length of time that the patient should remain in bed varies with each case and requires careful judgment on the part of the physician. Rest to the extent that ankylosis results should, of course, be avoided. Atrophy of tissues may be avoided to a large extent during the period of complete bed rest by massage given above and below the joints. Applying a general rule to these cases is extremely difficult but for the most part our patients are put on complete bed rest for not longer than three to six weeks. Following this initial period of complete bed rest the patient is placed on a modified rest regime and his activities are gradually increased.

Proper physical therapy treatment should be instituted in every case of chronic atrophic arthritis. Physical therapy should be administered with the object of accomplishing the following purposes: (1) Increase circulation to the affected joint; (2) prevent deformity and increase motion of the affected joint, and (3) overcome atrophy and fibrosis of muscles and periarticular tissues.

Effect of Heat and of Cold in Multiple Sclerosis

Abstract from Bull. Neurol. Inst. New York, 6:385, (Aug.) 1937. In J. A. M. A. 109: 17:1401, (Oct. 23) 1937.

Simons inquired into the effects of heat and of cold on the muscle strength, spasticity, numbness and bladder symptoms in twenty-one patients suffering from multiple sclerosis. Heat had a bad effect on the strength of 62 per cent of the patients. Efforts to learn whether the responsible factor is heat or ultraviolet rediation have not been satisfactory. Those patients who have had heat therapy have almost all noted at once marked weakness. Nineteen per cent had not complained of weakness, but became weak under the influence of heat. Of three who had ex-

tensive trials of ultraviolet therapy, two noted no effect and one felt worse. Several patients have had treatment with effective forms of vitamin D therapy without noticeable effects on their symptoms. This suggests that it is not the ultraviolet of sunlight but the heat itself which causes the distressing weakness. Fifteen per cent of the patients felt stronger under the influence of heat. Of thirteen patients complaining of spasticity, 24 per cent felt that heat increased their stiffness, but spasticity was not induced by heat in any patient who did not already complain of it. Two patients believed that stiffness was lessened by heat. The remainder of the twenty-one patients were unaffected by heat so far as spasticity was concerned. Hesitancy, urgency or incontinence was present in fifteen of the cases studied. Cold had no effect on the strength of 48 per cent of the series, 38 per cent were improved and 14 per cent were made worse by cold. Spasticity was unaffected by cold in 48 per cent and was made worse in only 24 per cent. The majority of patients noted no change in numbness during cold weather. The sphincters were not affected by cold in 57 per cent, and 29 per cent noted improved sphincter control. In general, cold has no specific deleterious effect on any one symptom.

Evidence Required by the Council on Physical Therapy for Consideration of Apparatus Used in Fever Therapy

J. A. M. A. 109:13:1041, (Sept. 25) 1937.

The Council on Physical Therapy will give consideration to apparatus designed, advertised and sold for the purpose of administering fever treatments. Manufacturers of such apparatus and appliances are asked to comply with the general requirements as stated in the booklet "Official Rules of the Council on Physical Therapy" and are requested to present the following additional information:

1. A full description of the construction and method of operation of the unit, including specifications, working plans, photographs, blue prints and also the patent number.
2. Temperature charts showing the time required to raise the rectal temperature of twelve patients from normal to at least 106° F.
3. Statement of the constancy with which any degree of rectal temperature may be maintained for five hours and evidence to support these claims.
4. Inclusion, in the data furnished, of the temperature and the relative humidity of the air within the chamber throughout the periods of treatment, if the apparatus comprises a chamber in which the body of the patient lies during treatment.
5. A report on any undesirable effects on patients with reference to:
   (a) Skin (danger of burns).
   (b) Heart (blood pressure and pulse).
   (c) Respiration.
   (d) Relative comfort or discomfort.
   (e) Incidence of delirium.
6. Energy input required to operate the unit.

The Council on Physical Therapy will give careful consideration to:

(a) The facility with which the condition of the patient's skin can be observed during treatment.

(b) The facility with which the patient's physical needs can be attended to during treatment.

(c) The facility and rapidity with which, in case of emergency, the patient can be withdrawn and restorative treatment administered.

Book Reviews

THE MACHINERY OF THE BODY. By Anton J. Carlson and Victor Johnson. Cloth. Price, $4.00. *Pp.* 580, *with* 187 *illustrations. Chicago: University of Chicago Press,* 1937.

This is an elementary work on how the human machinery functions. It is especially written for college freshmen. The authors have attempted to present the subject so that it is intelligible to the reader without previous training in physics, chemistry or biology. The authors have rendered a real service by presenting a truly remarkable book for the elementary student of physiology. It is neither too brief nor filled with controversial theories. An outline form heads each chapter and the material is presented under these topical headings. This is an unusual feature and of great value to the student in organizing his study. The authors have done a masterly piece of work in illustrating the text. The illustrations are many, unique and make readily understandable the work at hand.

The fame of Doctor Carlson alone would recommend the work but this volume speaks for itself. The book should be greatly appreciated by physical therapy students and

those interested in the field of physiology who do not care to read the more voluminous texts. Certainly its brevity does not detract from its scientific accuracy. Physical therapists should find this a valuable addition to their library.

YOUR DIET AND YOUR HEALTH. By Morris Fishbein, M. D., Editor, Journal American Medical Association and Hygeia. Cloth. Price, $2.50. Pp. 298. New York: McGraw-Hill Book Company, Inc., 1937.

This volume is one of the Whittlesey House Health Series. Advice on diets and advertisements for diet systems appear in our newspapers and magazines. Many of these diets are based on misconceptions and fallacies and it is dangerous for the public to follow these notions. The first chapters of this book consider the subjects of calories, the cost of food, hunger and appetite, digestion, debunking diets and peculiar schools of dieting, such as Dr. Hay's diet and the diet promoted by Benjamin Hauser.

The remainder of the book gives in simple unequivocal statements the most up-to-date and generally recognized truths about diets. The chapters on special diets, diet and weight, food sensitivities, and the vitamins give common sense advice on subjects often obscured by fads.

It is a book that can be recommended to everyone for it tells the layman the truth about diets and how to avoid foolish and dangerous diet fads.

PHYSIOLOGY IN HEALTH AND DISEASE. By Carl J. Wiggers, M. D., Professor of Physiology in the School of Medicine of Western Reserve University, Cleveland, Ohio. Second Edition. Cloth. Price, $9.00. Pp. 1124, with 191 illustrations. Philadelphia: Lea & Febiger, 1937.

Wiggers' "Physiology in Health and Disease" is an outstanding textbook not only for medical students but also for clinicians who wish to keep pace with such a rapidly growing science as physiology. More and more clinical medicine realizes that pathologic conditions are manifestations of aberrant physiology.

The author's scholarly presentation is the essence of twenty-five years of teaching. The author in this second edition has amplified many of his former physiological concepts while others have been rewritten so that they are more understandable. The book has an excellent bibliography and is well illustrated. The chapter which is entitled "Temperature Control—Hyperthermia—Fever" should prove of particular value to those physical therapists interested in artificial fever. This chapter alone places the book far ahead in the list of modern physiologies.

This textbook is highly recommended to physical therapy technicians who wish to keep pace with biophysics and physiological advance.

TO DRINK OR NOT TO DRINK. By Charles H. Durfee, Ph. D. Cloth. Price, $2. Pp. 212. New York & Toronto: Longmans, Green & Co., 1937.

The problem of the chronic drinker is an age old one. The medical diagnosis of "chronic alcoholism" has usually implied a poor prognosis except for temporary amelioration. The plight of the "drunkard" has been dramatized in the pulpit and on the stage. Oftimes its moral aspect has overshadowed the medical problem so that the treatment of chronic alcoholism has not been approached in the same manner as other medical illnesses. The author prefers the use of the term "problem drinker" inasmuch as he considers the individual who drinks excessively a psychologic problem in much the same light as one considers the problem child. He does not adhere to the older view of "once a drunkard, always a drunkard," and from his own experience in the handling of problem drinkers he has formulated a therapeutic approach which he claims has yielded very encouraging results. His underlying thesis is that the drinking of alcoholic beverages in excess is indicative of an escape mechanism. Confronted with difficult emotional or reality situations, some individuals, unable to make satisfactory adjustments, find a way out in alcoholism. The treatment of alcoholism, therefore, is the treatment of the afflicted one's problems of adjustment. Some of the author's successes seem to be "too good to be true," but his methods certainly are worthy of careful consideration so that the chronic alcoholic may be "cured" of his malady before organic changes occur in the nervous system and other organs which make treatment futile.

TEXTBOOK OF GENERAL PHYSIOLOGY. By T. Cunliffe Barnes, D. Sc., Assistant Professor of Biology, Yale University. Cloth. Price, $4.50. Pp. 554, with 166 illustrations. Philadelphia: P. Blakiston's Son & Co., Inc., 1937.

Doctor Barnes has written this textbook of general physiology for senior undergraduate students who have had preliminary studies in physics, chemistry and zoology. It is a book written from the biologist's viewpoint. Special attention is given to the subjects of water metabolism and physical models of living systems. The plan of the book presents first the physical chemistry of living systems, then follows a discussion of external and internal factors which regulate the organism. The first five chapters deal with the physical and chemical principles necessary for an elementary understanding of general physiology. This volume, written in a scholarly manner and excellently illustrated,—many of the illustrations being quite unique,—is especially suitable for those students who are interested in biophysics. It is not a textbook for those students who are without a good knowledge of physics, chemistry and mathematics.

ELECTRICITY IN THERAPEUTICS. A TECHNICAL AND CLINICAL COMPENDIUM. By Harold H. U. Cross, Ph. D., Formerly Research Worker at the Stanford University, California; Certificate Electro-Radiology, Faculty of Medicine, Paris; Assistant Libre, Hôpital Laennec and Hôpital La Pitié, Paris. Preface by Dr. Georges Brouguignon, Electro-Radiologist at the Salpetrière. Cloth. Price, 25 shillings. Pp. 380, with 239 illustrations. London: Crosby Lockwood & Son, Ltd., 1936.

The author of this volume gives some excellent discussions on the mechanics of electrotherapy. There is a chapter on electrodiagnosis with a good description of the use of the chronaxy apparatus. Under electrolysis there is given a good technic for removal of superfluous hair. Genito-urinary surgeons of this country will not agree, however, with his statement that: "Another popular use for electrolysis is found in the dissolving of urethral strictures."

There are over sixty pages devoted to ionic medication with good descriptions of technic, but several questionable uses of this method are given, such as the use of the iodine ion medication in the treatment of exophthalmic goitre and pulmonary tuberculosis, and transcerebral calcium ionization in hemiplegia.

Ultraviolet and infra-red radiation are considered in the next two chapters. Here again the technical considerations are excellent but many of the therapeutic claims are questionable. In discussing the treatment of chronic and acute urethritis with ultraviolet radiation, the author states: "Use the cold-quartz electrode (low frequency lubricated with colourless mineral oil prepared for internal use), but on no account apply for more than five *seconds*." Medical men of California will no doubt be surprised at the author's next statement: "This treatment is largely employed in California."

The subject of high frequency currents gives some illustrations that are regarded in the United States as of historical interest only, such as glass high frequency electrodes and the auto-condensation couch which are used infrequently in this country.

This book has much of interest to those specializing in physical therapy but its advice on therapeutics is such that it cannot be recommeded to the student of this subject.

THE PRINCIPLES AND PRACTICE OF CLINICAL PSYCHIATRY. By Morris Braude, M. D., Associate Clinical Professor of Psychiatry, Rush Medical College, The University of Chicago. Cloth. Price, $4.00. Pp. 382, with 7 illustrations. Philadelphia: P. Blakiston's Son & Co., Inc., 1937.

This book is essentially a handbook of psychiatry which should be found useful by the medical student, nurse or technician who find it difficult and tedious to study the voluminous textbooks on this subject. To be sure, however, recourse to the latter texts as reference sources should be utilized. The subject of mental disease is taken up in the usual manner with chapters on the psychogenic psychoses, the organic and toxic psychoses, mental disturbances associated with food deficiency, et cetera. Special chapters on constitutional psychopathy, malingering and mental deficiency are also included. The psychoneuroses so commonly observed in clinical medicine deserve more consideration than is given by the author but are presented in a concise and understandable manner. A brief chapter on psychoanalysis reveals the author as a conservative therapist who awaits further proof of the value of this dynamic approach to the problems of nervous disorders.

The chief purpose of this book—a brief discussion of the essentials of psychiatry—is fulfilled and hence it may be recommended for such usage.

EMOTIONAL ADJUSTMENT IN MARRIAGE. By Le Mon Clark, M. S., M. D., Assistant in Obstetrics and Gynecology, University of Illinois College of Medicine. Cloth. Price, $3.00. *Pp.* 261. *St. Louis: C. V. Mosby Company,* 1937.

It is obvious that more recently there has been a definite awakening of both the layman and the professional person to the fact that precise knowledge of human behavior is deserving of recognition. The role of emotions in the everyday life of the individual is receiving more and more attention. The prevalence of emotional maladjustment in marriage is no longer a secret, nor are the reasons for such difficulties enshrouded in the mysteries engendered by the taboos and pseudo-morality of the past.

Human beings of today are perfectly willing and anxious to know the whys and wherefores, particularly regarding the important matter of sex. This book is one of the recent publications which seek to give adequate information on this important subject. Recognizing that the instinctual nature of the sexual urge is a powerful force which must be dealt with eventually, the author lets down the barriers and discusses in clear, straight-forward language the many aspects of this important subject. The recognized conflict between the biologic urge and so-called moral regulation is an important problem in the love-life of the individual. This is particularly true of the unmarried. Early marriages theoretically should solve the problem through the avoidance of repression and of inadequate adjustment through sublimation. The prevalence of late marriages in our modern civilization, however, has resulted in the creation of emotional problems which are almost universal. There are many individual factors which determine the manner in which a wholesome adjustment may be reached. These factors are discussed frankly and critically. Most of the book deals with the sexual life of the married. Ignorance of the anatomy and physiology of the sexual apparatus is frequently the cause of considerable difficulty. More commonly, however, psychologic conditioning and the lack of understanding of the psychosexual aspects of intercourse are responsible for marital disharmony.

The art of love making as well as the mechanics are explained by the author, dealing first with the proper behavior during the honeymoon and the early years of marriage. There are chapters on the theory and practice of contraception. The author recommends premarital consultation with a qualified consultant to furnish the information which should be helpful in preventing emotional maladjustments.

Anyone who reads this book should gain a better understanding of this vital phase of human behavior.

DOCTORS ON HORSEBACK. PIONEERS OF AMERICAN MEDICINE. By James Thomas Flexner. Cloth. Price, $2.75. *Pp.* 370, *with* 10 *illustrations. New York: The Viking Press,* 1937.

John Morgan, who was considered the most brilliant physician in the Colonies, is considered in the first chapter. His services as director general of hospitals of the Colonial army under Washington, the founding of the first medical school in America, and his advanced ideas of medical education make an interesting character study.

Benjamin Rush signed the Declaration of Independence at the age of thirty-one. He became the first great doctor of the United States and the most powerful physician our nation has ever known. Among his many new suggestions was one about the Pennsylvania Hospital where he suggested that madmen be treated by occupational therapy.

The third chapter describes the life of Ephraim McDowell,—a surgeon on horseback of the Kentucky frontier. The account of McDowell's operation on Mrs. Crawford should be read by everyone. The courage of the doctor and his patient made possible in 1809 the first ovariotomy. The doctor knew if he operated and the patient died, a coroner's jury would find him guilty of murder. Yet he operated while a crowd waited outside his house with a rope strung over a tree so that they might not lose any time in hanging the surgeon when Mrs. Crawford died. The patient, who was 47 years old, was strapped to a plain wooden table; she had no anesthetic but sang hymns during the operation until unconscious. She recovered and remained in excellent health until her death at the age of seventy-nine.

The next biography is that of Daniel Drake, who although almost illiterate at the age of fifteen, became a scholar of world-wide re-

nown, the inspiration of generations of doctors west of the Alleghenies, founder of universities, writer and scientist. He published a monumental treatise on "Diseases of the Interior Valley of North America." It was the most important contribution to medical geography since the days of Hippocrates.

The life of William Beaumont, the army doctor who became one of America's greatest physiologists, is another interesting chapter.

The final chapter on the "Death of Pain" describes the discovery of ether at two separate times,—once by Crawford W. Long, a rural Georgia practitioner in his twenties, and once by William T. G. Morton, a dentist not yet out of Harvard Medical School.

The book is well printed and illustrated and can be highly recommended.

ARTIFICIAL FEVER PRODUCED BY PHYSICAL MEANS; ITS DEVELOPMENT AND APPLICATION. By Clarence A. Neymann, A. B., M. D., F. R. S. M., Associate Professor of Psychiatry, Northwestern University Medical School, Honorary Professor of Medicine, National University of Mexico, C. R. B. Exchange Professor to the Universities of Ghent, Liege, Louvain and Brussels, Belgium. Cloth. Price, $6.00. *Pp.* 285, *with* 68 *illustrations. Springfield, Illinois: Charles C. Thomas,* 1937.

The arrival of this volume is timely. It is also fitting that the author who has been the pioneer in this field of therapy should present the first work of this new field of therapeutics. It is written in a scholarly manner and presents only the use of artificial fever in those diseases in which it has proven its value. It is conservative, authoritative and will be of the greatest value to those using this form of therapy as well as to those investigating its merits. The following subjects are dealt with: The physiology of hyperpyrexia, the technique of electropyrexia, dementia paralytica, syphilis of the central nervous system, primary and secondary syphilis, multiple sclerosis, chorea minor, arthritis, gonorrhea, asthma and other diseases. While the research of Neymann has become known the world over, he has not neglected the findings of other workers in this field. The author has evaluated in a masterly manner the value of multitudinous methods of producing fever and has summarized it in such a scientific manner that a tyro can readily understand the rationale behind each method. This in itself is of inestimable value to workers in this field at this particular time.

Anyone interested in or working with artificial fever cannot afford to be without this valuable book.

ARTERIOVENOUS ANEURYSM: ABNORMAL COMMUNICATIONS BETWEEN THE ARTERIAL AND VENOUS CIRCULATIONS. By Emile Holman, A. B., B. A., Oxon., M. D., Professor of Surgery, Stanford University Medical School; Surgeon-in-Chief, Lane and Stanford University Hospitals. (This is one of the Macmillan Surgical Monographs edited by Elliott C. Cutler, A. B., M. D.) Cloth. Price, $5.00. *Pp.* 236, *with* 79 *illustrations. New York: The Macmillan Company,* 1937.

The book opens with a description of the technic used in the production of experimental arteriovenous aneurysms. This is followed by a description of the physiological and pathological changes which take place following the production of the fistula, and after the repair of the fistula. A brief history orients the reader as to the work which has been done on the subject up to the present time. Signs and symptoms characteristic of fistulae in their respective sites are outlined. These signs and symptoms are constant enough to make the clinical diagnosis of a fistula possible. Operative procedures are described which keep in mind the principle that the balance in the arterial-venous flow to the part must be preserved if possible. Evidence is presented which shows the probable mechanism of development of congenital fistulae. Congenital defects which result in abnormal blood flow through the heart, such as patent ductus arteriosus, inter-ventricular septum, and foramen ovale are described. The physiological and pathological changes associated with the above defects are discussed.

The book is illustrated with well chosen charts, graphs, drawings and photographs. The descriptions of the physiological and pathological processes are not so involved but what they can be followed, and their explanations appear logical.

Case histories of peripheral and intracranial fistulae, and the protocols of the work done on experimental animals are found in the appendix, and a bibliography completes the book.

This book should be most instructive to those interested in the physiology and pathology of the circulation. The author in his summary has pointed out numerous questions which as yet remain unanswered.